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Report to Congress

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PROGRESS TOWARD IMPLEMENTING SUPERFUND
FISCAL YEAR 1988

REPORT TO CONGRESS

REQUIRED BY

SECTION 301 (h) OF THE
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AND LIABILITY ACT (CERCLA) OF 1980,
AS AMMENDED BY THE
SUPERFUND AMENDMENTS AND
REAUTHORIZATION ACT (SARA) OF 1986

OFFICE OF EMERGENCY AND REMDIAL RESPONSE
U.S. ENVRIONMENTAL PROTECTION AGENCY

APRIL 1990

NOTICE

This Report to Congress has been subjected to the United States Environmental Protection Agency's review process and approved for publication as an EPA document. For further information about this Report, contact the Policy and Analysis Staff in the Office of Program Management, Office of Emergency and Remedial Response at 202/382-2182. Individual copies of the Report can be obtained from the Office of Research and Development Publications by writing to: 26 West Martin Luther King Drive, Cincinnati, Ohio 45268, or by calling 513/569-7562.

FOREWORD

We are pleased to submit the Environmental Protection Agency's Annual Report on the progress made by the Agency during fiscal year 1988 in implementing the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. This Report, and the information it contains, is required by CERCLA section 301(h). The Report includes a description of minority firm participation in Superfund contracts, and of our efforts to encourage their participation, as required by section 105(f). The Report meets the requirement of section 301(h)(1)(E) for an annual update on progress being made on sites subject to review under section 121(c). In addition to satisfying the section 301(h)(1)(E) requirement, this Report satisfies similar reporting requirements of section 121(c). The report of the EPA Inspector General on his findings concerning the reasonableness and accuracy of the information in this Report related to EPA's activities, as required by section 301(h)(2), is included as Appendix F.

Significant progress was made in field activities during the fiscal year. The Agency completed a record breaking 282 removal actions using CERCLA funds or enforcement authorities. In addition, EPA completed remedial actions at 24 sites and started 72 remedial actions. More than 150 Records of Decision were signed during the fiscal year, twice the number signed in FY87. Much of the Agency's progress was characterized by efforts to satisfy statutory schedules and requirements. For example, the Agency completed almost 1,000 preliminary assessments during the first quarter of FY88. This effort allowed the Agency to meet the statutory requirement that preliminary assessments be conducted by January 1988 on all sites entered into the CERCLA Information System as of October 1986. The Agency strengthened its enforcement efforts, increasing the percentage of clean-up activities that are funded by potentially responsible parties and negotiating more settlement agreements during FY88 than in any prior fiscal year. The Agency also put the final touches on the proposed revisions to the hazard ranking system (HRS) and the National Contingency Plan (NCP). The revisions to both the HRS and the NCP are required by CERCLA, as amended by SARA, and were published in the *Federal Register* for public review and comment shortly after the end of FY88.

In addition to providing an overall perspective on progress in the past fiscal year, the Report also contains information that Congress specifically requested in section 301(h)(1), including a detailed description of each of the 152 Records of Decision that were signed in fiscal year 1988; a report on the status of remedial actions, including enforcement activity, in progress at the end of the fiscal year; and an evaluation of newly developed feasible and achievable permanent treatment technologies.

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Progress Toward Implementing Superfund: Fiscal Year 1988

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1.0 EXECUTIVE SUMMARY

The Environmental Protection Agency (EPA or the Agency) made significant progress in implementing Superfund and cleaning up the nation's worst contaminated sites during FY88. Section 301(h) of CERCLA, as amended by SARA, requires EPA to prepare and submit to Congress an annual report on the progress made towards implementing Superfund. This second annual Report to Congress builds on the information contained in the original fiscal 1987 report. It provides an overview of EPA's progress in implementing a wide range of Superfund program activities during fiscal 1988 and information on specific program activities as required by the statutory language. EPA completed drafting this Report before issuing the study commissioned by Administrator Reilly, *A Management Review of the Superfund Program*, and it, therefore, does not contain information on Agency progress toward implementing recommendations from that study.

The primary focus of the Superfund program has been on the actual cleanup and remediation of hazardous substance releases and contaminated sites. Cleanup under the Superfund program is achieved through two types of response actions, shorter-term removal actions and longer-term remedial actions. This Report documents the Agency's progress in implementing Superfund during the fiscal year. Specifically, the Agency has sought to:

- Accelerate the pace of Superfund clean-up actions;
- Implement the use of more permanent remedies and intensify technology research and development;
- Strengthen Superfund enforcement activities;
- Improve the program management infrastructure;
- Implement more efficient Superfund contracting procedures; and
- Increase the participation of states, Indian Tribes, and local communities in the Superfund program.

Fiscal 1988 Accomplishments

Many Superfund program accomplishments in FY 1988 were significantly higher than those for FY 1987, with removal and remedial actions up overall. In the remedial program work was underway at 580 of the 797 sites listed as final on the National Priorities List (NPL), versus 533 sites in FY87. The Agency completed 282 removal actions, 64 at proposed or final NPL sites, and it started 328 removal actions. The number of starts and completions are both records. EPA also completed 31 remedial action (RA) projects and started 72, the latter a program high.

The remedial program witnessed other major achievements. A record 132 remedial action (RA) projects were in progress, nearly a 70 percent increase over the 79 in progress at the end of the last fiscal year. FY 1988 saw the signing of 152 records of decision (RODs) during the year. Also, a record 99

remedial designs (RD) had been started by year-end. Exhibit 1 01 illustrates the Agency's field work accomplishments for FY88.

Accomplishments attributable to enforcement program actions were significantly higher this fiscal year than the last fiscal year. Potentially responsible parties (PRPs) completed 74 of the 282 removal actions, more than twice the 31 completed in FY 1987. PRPs also undertook 108 of the 328 removal actions that were started.

Of the 72 remedial action (RA) starts, PRPs financed 21; they also financed 11 of the 31 RAs completed during the year. PRPs will finance cleanup for 50 of the 152 RODs that were signed, and they started 30 of the 99 remedial designs (RDs), which are increases over FY87 levels in both categories.

The Agency also made progress in meeting the statutory goals for Remedial Investigations/Feasibility Studies (RI/FS), and Remedial Actions (RA). By year-end, 224 of the required 275 RI/FS new starts at NPL sites were underway, and RA contracts had been awarded for 74 of the required 175 RA new starts. (Exhibit 1.0-2 illustrates progress toward meeting the RI/FS and RA statutory goals.)

The Superfund enforcement program met or exceeded most targets, resulting in record-setting accomplishments. By the end of the fiscal year, EPA had negotiated more settlement agreements with PRPs than in any prior year, bringing the total settlement value to more than one billion dollars since the start of the program in 1980. The FY88 total includes 29 consent decrees worth approximately $270 million in RD/RA work and unilateral settlement orders at seven sites for RD/RA work worth approximately $50 million. Fifty-six cost recovery referrals from the EPA Regions to Headquarters under section 107 seeking more than $120 million, exceeded the target of 49. The Agency also reached 36 cost recovery settlements with an approximate value of $20 million.

The Agency exceeded its FY88 Superfund Comprehensive Accomplishments Plan (SCAP) targets for both PA and SI completions. The PA total of 2,884 PA completions exceeded the target of 2,432 by 19 percent. The SI total of 1,237 completions exceeded the target of 1,117 by 11 percent. Five sites were deleted from the NPL, and the Agency proposed for deletion nine additional sites. Also during the fiscal year, EPA proposed to list 229 sites on the National Priorities List (NPL), bringing the total number of final and proposed sites to 1,175 at the end of the fiscal year.

Shortly after the end of the fiscal year, the Agency issued both the proposed revisions to the National Contingency Plan (NCP) and the Hazard Ranking System (HRS). The NCP is the Agency's "blueprint" for conducting removal and remedial actions under the Superfund program. The HRS is the Superfund pre-remedial tool used to identify sites warranting inclusion on the NPL. Both of these activities are specifically mandated by CERCLA.

Continuing implementation of recent contract initiatives supported field activities. EPA completed Alternative Remedial Contract Strategy (ARCS) contract negotiations in all 10 Regions and awarded contracts in Regions 2, 3, and 5. The Agency also took advantage of two new Environmental Services Assistance Teams Contracts that support Superfund laboratory needs. The

Exhibit 1.0-1

Fiscal 1988 Field Work Accomplishments

REMOVAL ACTION	
Starts	328
Completions	282
REMEDIAL ACTION	
Starts	72
Completions	24
FINAL REMEDIAL ACTION COMPLETIONS*	7

* Completed actions for sites at which the Agency does not anticipate any need for future remedial action starts.

SOURCES: CERCLIS; Superfund Site Completions and Deletions from the National Priorities List, HSCD/OERR, October 25, 1988.

provision of management assistance in analytical services is expected to improve and streamline the cleanup process.

Exhibit 1.0-3 summarizes overall accomplishments for FY88, and Exhibit 1.0-4 compares FY88 accomplishments with those of prior fiscal years.

Resource needs continued to grow in FY88, and resources were directed to activities where they were most needed. The percentage of resources directed to the Regions increased to 67 percent of the total workyears (1783 out of 2642 total workyears) funded under the program. EPA prepared its last budget (for FY91) under the current authorization during the summer and fall of 1989.

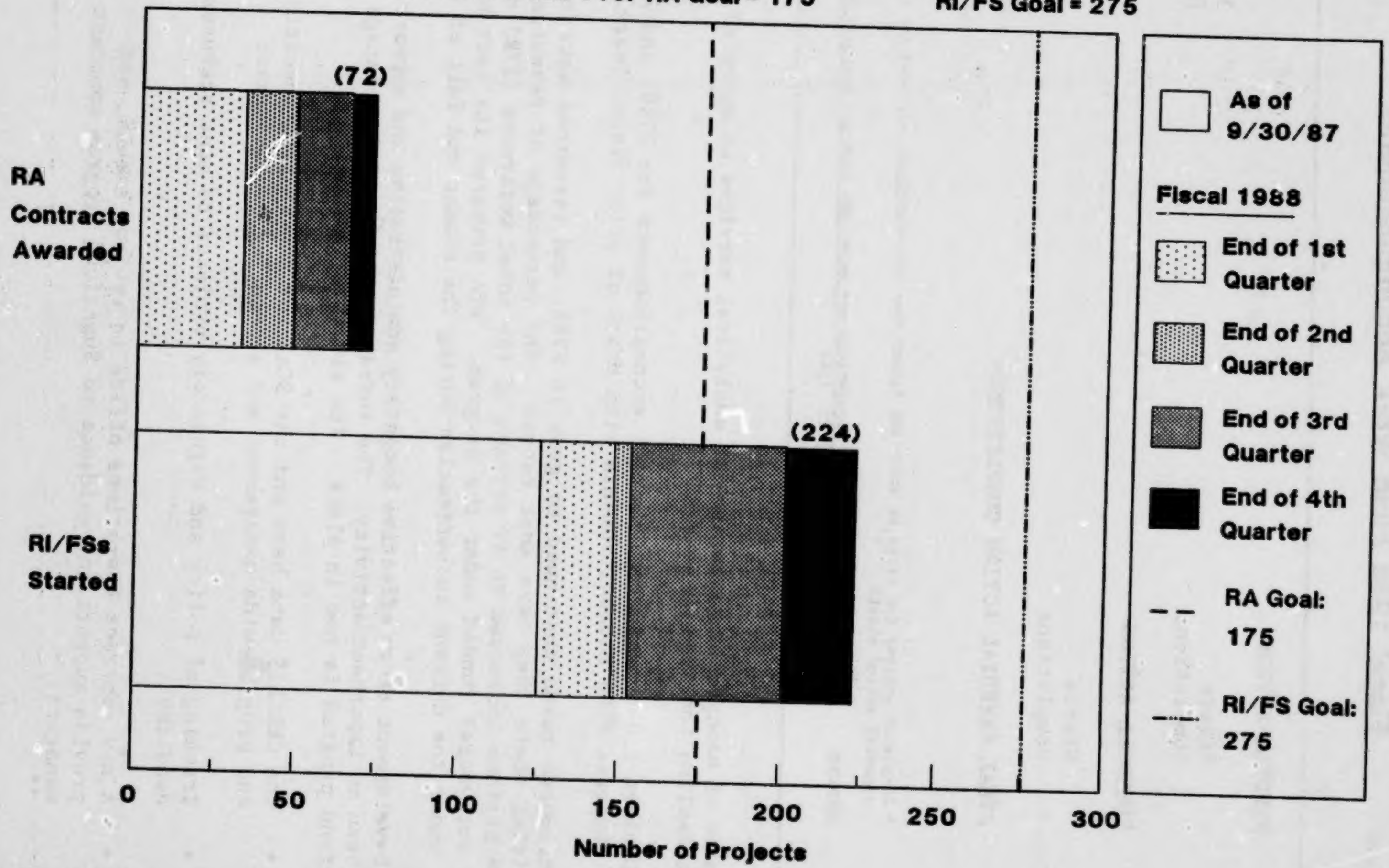
Development of an effective budgetary administrative and support system has also been an important activity. The infrastructure needed to manage a maturing Superfund program is now in place. Its elements include:

- The CERCLIS data base and the SCAP for annual site-specific and program-wide management and accounting of resources;
- Tracking of policy and regulatory projects to meet statutory deadlines;
- A new contract operations office to review, assess, and provide support and guidance to Superfund program contract managers;

Exhibit 1.0-2

Progress Toward Meeting CERCLA Section 116 Goals

CERCLA section 116: RA Goal = 175 RI/FS Goal = 275



SOURCE: OSWER Annual Report: Fiscal Year 1988; November 1988.

Exhibit 1.0-3

Summary of Fiscal 1988 Superfund Program Activities

REMOVAL	
Completions	282
Fund-financed	*(208)*
PRP-financed	*(74)*
Starts	328
Fund-financed	*(220)*
PRP-financed	*(108)*
Expedited Response Actions	7
Fund-financed	*(7)*
PRP-financed	*(0)*
PRE-REMEDIAL	
CERCLIS Inventory-Sites Added	2,442
PAs - Preliminary Assessments	2,884
SIs - Site Inspections	1,237
NPL - National Priorities List (Program to date)	1,175
Proposed sites for listing	*(229)*
Final sites listed	*(0)*
Sites proposed for deletion	*(9)*
Sites deleted	5
REMEDIAL	
Sites where work was completed during FY88	7
Sites with remedial activities in progress on September 30, 1988	580
RODs - Records of Decision Signed	152
RI/FSs -- Remedial Investigation/Feasibility Study Completions	152
Fund-financed	*(102)*
PRP-financed	*(50)*
RI/FSs - Starts	150
Fund-financed	*(93)*
PRP-financed	*(57)*
RI/FSs in progress on September 30, 1988 (including 14 stand-alone FSs and 9 stand-alone RIs)	563
RDs - Remedial Design Completions	76
Fund-financed	*(55)*
PRP-financed	*(21)*
RDs - Remedial Design Starts	99
Fund-financed	*(69)*
PRP-financed	*(30)*

SOURCES: Report to Congress on Progress Toward Implementing Superfund: Fiscal Year 1987, OERR, April 1989; CERCLIS; FY 1988 ROD Summary Report, HSCD/OERR, March 1989; Superfund Completions and Deletions from the National Priorities List, HSCD/OERR, October 25, 1988.

Exhibit 1.0-3
(continued)

Summary of Fiscal 1988 Superfund Program Activities

RAs - Remedial Action Completions		31
Fund-financed		*(20)*
PRP-financed		*(11)*
RAs - Remedial Action Starts		72
Fund-financed		*(51)*
PRP-financed		*(21)*
RAs in progress on September 30, 1988		132
ENFORCEMENT		
Negotiated Settlements		226
Approximate Value	*$470,000,000*	
Consent Decrees for RD/RA Work		29
Approximate Value	*$270,000,000*	
RI/FS Settlements		77
Approximate Value	*$ 85,000,000*	
Removal Settlements		94
Approximate Value	*$ 67,000,000*	
Unilateral Orders - issued		14
Approximate Value	*$136,000,000*	
Unilateral Orders - settlements		7
Approximate Value	*$ 50,000,000*	
Cost Recovery Referrals from Regions to Headquarters		56
Approximate Value	*$120,000,000*	
Cost Recovery Referrals to Department of Justice		59
Approximate Value	*$ 27,000,000*	
Administrative Cost Recovery Settlements		36
Approximate Value	*$ 20,000,000*	

SOURCES: CERCLIS: FY 1988 ROD Summary Report, HSCD/OERR, March 1989; The Superfund Progress Report as of September 30, 1988, OSWER, December 29, 1988; OSWER Annual Report: Fiscal Year 1988, November 1988.

Exhibit 1.0-4

Summary of Program Activity By Fiscal Year

Activity	FY80	FY81	FY82	FY83	FY84	FY85	FY86	FY87	FY88	Program Total
Removal Completions	-	18	67	108	229	208	176	226	282	1,314
CERCLIS Site* Inventory	8,000	10,500	13,386	16,309	18,884	22,621	25,194	27,571	30,013	30,013
PA Completions	2,204	1,072	1,209	1,809	4,447	5,181	4,262	4,001	2,884	27,069
SI Completions	613	428	566	642	1,308	1,618	1,267	1,343	1,237	9,022
NPL Sites Added**	-	-	-	406	132	3	170	99	229	1,039
RI/FS Starts	-	21	35	123	155	188	83	183	150	938
RODs Signed	-	-	4	13	38	68	84	75	152	434
RD Starts	-	5	4	12	21	29	45	94	99	309
RA Starts	-	-	9	11	25	15	21	54	72	207
NPL Deletions	-	-	-	1***	-	-	8	-	5	14

NOTE: * The figures reported in this row (unlike the other figures reported in this exhibit) represent the cumulative total of sites in CERCLIS at the end of each fiscal year, rather than the number added in each fiscal year.

** Includes sites proposed for listing on the NPL.

*** The Report to Congress on Progress Toward Implementing Superfund: Fiscal Year 1987, reported that five sites were deleted from the NPL in fiscal 1982. Four of these sites were listed on the Interim Priorities List and were cleaned up prior to the publication of the first group of sites proposed for the NPL. The fourth site was included in the initial list of sites proposed for the NPL. EPA, however, determined that the PRPs had sufficiently cleaned up the site while it was on the list of proposed sites and, therefore, deleted it on September 8, 1983.

SOURCES: Report to Congress on Progress Toward Implementing Superfund: Fiscal Year 1987, OERR, April 1989; CERCLIS; FY 1988 ROD Summary Report, HSCD/OERR, March 1989; Superfund Site Completions and Deletions from the National Priorities List, HSCD/OERR, October 25, 1988.

- Alternative Remedial Contract Strategy contracts, mini-Emergency Response Cleanup Services contracts, and Technical Assistance Team contracts; and
- A document information management system.

Removal Program Activities

During FY88, the removal program surpassed its FY87 record of 226 completed removal actions by a wide margin. The Agency completed 282 removal actions: 208 using fund resources, and 74 funded by potential responsible parties (PRPs). Sixty-four of the total actions completed were undertaken at sites listed on the NPL. In addition, the Agency started a record 328 removal actions, 108 of which are being financed by PRPs and 79 of which were started at sites listed on the NPL.

The Agency also completed the *Removal Action Universe Study* in FY88. EPA plans to use the information gathered to modify the budget and planning process to better meet removal program needs. The Agency also issued several key guidance documents needed to implement the removal program during FY88 that:

- Describe all of the procedural and administrative requirements for removal actions;
- Clarify the SARA section 104(c) exemption from the statutory time and dollar limits on removal actions;
- Provide comprehensive cost management procedures for use by EPA when conducting Fund-financed removals;
- Establish a new action level for response to contamination of a drinking water supply; and
- Instruct On-Scene Coordinators (OSCs) and administrative support staff in the requirements for on-site file management at removal sites.

Also, EPA began preparing guidance on several other important aspects of the removal program, including draft guidance on post-removal site control.

Remedial Program Activities

EPA completed a greater total number of remedial program activities during FY88 than in any other year of the Superfund program. Work at the construction end of the remedial process has steadily increased. From the enactment of CERCLA through September 30, 1988, 207 remedial action projects had begun. Moreover, the number of sites at which remedial actions have been PRP-financed has increased from seven in FY85 to 21 in FY88. The Agency also completed 31 remedial actions (RAs) in FY88, of which 19 were first completions, five were subsequent, and seven were final site completions. In addition, the Agency started 72 RAs, of which PRPs financed 21 and the Fund financed 51.

In addition to the strides that the Agency has made in completing site activities, at the end of the year, remedial activity had begun at 580 of the 797 sites listed as final sites on the NPL. The Agency completed 76 remedial designs (RDs), of which 61 were first and 15 were subsequent completions. The Agency also started 99 RDs, of which PRPs financed 30 and the Fund financed 69.

Ninety-five of the 152 RODs signed in FY88 addressed source control, with 68 RODs involving treatment technologies. Of the RODs involving source control treatment technologies, 26 (34 percent) involved incineration or thermal destruction, 18 (24 percent) involved solidification or stabilization, 10 (13 percent) involved vacuum extraction, and the remaining 22 involved other treatment technologies.

Thirty-nine of the RODs were ground-water remediation only, four were source control interim actions, and 14 were no-further action. Forty-nine of the RODs employed both source control and ground-water remedies.

The remedial program also further developed the RI/FS Improvements Initiative, which was begun in FY87. The goal of the RI/FS Improvements Initiative is to improve the schedule and cost-efficiency of the RI/FS process while also improving the technical quality of RI/FS work. The Office of Solid Waste and Emergency Response (OSWER) issued detailed guidance for implementing short-term steps in the Initiative in April 1988. OSWER also established workgroups to address the more complex, long-term issues and issued a interim final guidance on them in October 1988.

From its eight-year experience with the Superfund program, EPA has learned that remedial activities can become increasingly costly and time-consuming. The Agency, therefore, has recently increased its efforts to streamline the stages of the remedial process. In FY88, the Agency completed an *RI/FS Cost Study* to determine the reasons for RI/FS cost growth and the best plan for controlling costs. To address the recommendations of the cost study, EPA has implemented the Alternative Remedial Contracts Strategy, which promotes continuity throughout the performance of remedial work at each site. Recommendations also are addressed by the *RI/FS Improvements Initiative* and several expert systems for estimating the costs of remedial actions.

Pre-Remedial Program Activities

Pre-remedial activities are investigative and analytical activities undertaken to evaluate the threat or potential threat to human health or the environment posed by conditions at a site. In FY88, the Agency met the statutory goal of completing preliminary assessments (PAs) on all sites in CERCLIS at the time CERCLA was amended (October 17, 1986). In order to accomplish this goal, the Agency completed PAs on almost 1,000 sites during the first quarter of the fiscal year. Over the entire fiscal year, EPA completed 2,884 PAs, bringing the total number of PAs completed by the Superfund program to 27,069. As of September 30, 1988, only 2,944 sites in the CERCLIS inventory still required PAs. In addition, EPA conducted 1,237 site inspections (SIs) during FY88. This brings the total number of SIs completed by the Superfund program to 9,022.

The Agency proposed 229 sites to be listed on the NPL and deleted five sites, and published notice of its intention to delete nine additional sites.

Also, the Agency further developed and partially implemented a strategy, begun in FY87, to expedite the pre-remedial process. The strategy has resulted in a restructuring of the program to provide EPA with enough information early in the pre-remedial process to decide expeditiously which sites require further EPA evaluation. The PA has been expanded in scope and involves more site-specific research. The SI is now divided into two steps: (1) the screening SI; and (2) the listing SI. The Agency is currently conducting field tests to fine-tune these changes in the pre-remedial program.

Enforcement Program Activities

FY88 continued the trend that was begun in FY87 toward the increased use of PRP monies to fund clean-up activities, increasing the proportion of PRP dollars to total expenditures. From the beginning of the Superfund program in 1980 through the end of FY88, EPA has reached settlements for PRPs to conduct response activities worth over one billion dollars. During FY88, EPA negotiated a total of 226 settlements with a total value of approximately $470 million, the most of any year since the start of Superfund. These negotiations resulted in 55 RD/RA settlements with an approximate total value of $320 million. This includes 29 consent decrees lodged worth approximately $270 million in RD/RA work; another 19 consent decrees signed by PRPs for RD/RA work are currently in government concurrence, with the value of response yet to be determined. The number of consent decrees lodged represents a 300 percent increase over the number of decrees lodged in FY87. In addition, EPA negotiated 77 RI/FS settlements worth approximately $85 million, and 94 removal settlements worth approximately $67 million. These settlements are for first or subsequent starts, or for takeovers of projects that EPA has already begun.

If EPA cannot reach a settlement at a site with a PRP, and if the site poses an immediate threat to human health and the environment, the Agency can use its authority under section 106 of CERCLA to issue a unilateral administrative order against the PRP. EPA issued 14 unilateral orders under section 106 during FY88 with a potential value of $136 million. Of the 14, seven resulted in RD/RA settlements worth approximately $50 million, one case was settled under a lodged consent decree, two were referred to the Department of Justice, and the remainder are awaiting PRP responses.

In cases where PRPs do not perform the clean-up work at sites, EPA has the authority under section 104 of CERCLA to initiate response actions at the site without delaying to ascertain the outcome of legal action, and subsequently to file suit against PRPs under section 107 of CERCLA to recover Superfund money spent by the Agency at the site. From the inception of SARA through the end of calendar year 1988, EPA had reached 166 cost recovery settlements with an estimated value of $139 million. During FY88 alone, EPA recovered a total of more than $55.6 million from PRPs at 121 sites; even greater numbers of settlements with larger dollar values are expected in FY89. Cost recovery referrals under section 107 exceeded the target of 49; 56 cases were referred from the EPA Regions to Headquarters, seeking over $120 million.

Also, EPA issued two guidance documents in FY88 related to cost recovery: (1) *The Superfund Cost Recovery Strategy*, issued on July 29, 1988, which provides an overall framework for cost recovery actions; and (2) *Guidance on Documenting Decisions Not to Take Cost Recovery Actions*, which discusses information necessary to document the basis of EPA's decisions when recovery of unreimbursed Superfund monies is not being sought. In addition, on June 7, 1988, EPA delegated concurrence on most section 107 cost recovery actions to the Regions, providing them the authority to take these actions without prior Headquarters approval.

Major Rulemakings

The Agency undertook a major effort to revise the NCP in fiscal 1988. The proposed revisions were published in the *Federal Register* on December 21, 1988, and reflect the CERCLA section 105 requirement that the NCP be revised to incorporate the new statutory requirements of SARA. For the remedial program, the proposed revisions incorporate a process to meet statutory clean-up standards whereby remedial alternatives are evaluated against nine criteria, beginning with the threshold criteria of overall protection of human health and the environment, and compliance with federal and state applicable or relevant and appropriate requirements (ARARs).

The Agency also completed the proposed revisions to the HRS during FY88. Proposed revisions were published in the *Federal Register* on December 23, 1988. The proposal would add a number of new evaluation factors to the scoring system as required by CERCLA section 105, such as the threat that site contamination poses to the human food chain and ambient air quality, and the effect of contamination of surface water used for human consumption and for recreational purposes. The revisions also would meet the general mandate in section 105 that the HRS, "to the maximum extent feasible," accurately assess the relative risk to human health and the environment posed by potential NPL sites. The Agency expects to finalize the rule in the second half of fiscal 1989.

In addition, EPA developed two proposed rulemakings adjusting reportable quantities (RQs) for specific CERCLA hazardous substances. The first adjusts RQs for 273 CERCLA hazardous substances, mostly carcinogens. The second adjusts RQs for 757 radionuclides. The Agency also published two proposed rules that interpret statutory reporting requirements. One proposes the Agency interpretation of the reporting requirements for continuous releases under CERCLA section 103(f)(2). The other explains the Agency's interpretation of the exemptions under CERCLA section 101(10) for federally permitted releases.

Program Management Initiatives

Completing the Superfund program management infrastructure was a significant accomplishment this fiscal year. The Agency has developed, through the use of CERCLIS, a number of reports that will provide a wide range of program performance data for management personnel. Reports can include target and accomplishment information for selected SCAP categories,, such as first and subsequent RI/FS starts, RODs, RDs, and RAs. Enforcement reporting includes RD/RA negotiations and settlements and cost recovery actions. Senior management reports also will contain progress, duration, and cost analysis of RI/FS projects, and status of Regional resource or full-time equivalent utilization.

In FY88, the Agency also made progress in modifying and updating the operational status of CERCLIS. The updated site-specific data base became operational early in the fiscal year and is being used by the Regions to track and store information on particular sites. Overall, each Region enters an average of 1,000 transactions into its Regional data base each day. WasteLAN is a personal computer-based version of CERCLIS that operates as a local area network data base. WasteLAN became operational in Region 4 in FY88 and a trial version of WasteLAN was made available to all the other Regions for evaluation. Implementation is currently underway in Regions 2, 3, and 5.

CERCLA section 116 requires the Agency to start RI/FSs for at least 275 sites by October 1989 and to start RAs for at least 175 additional sites by October 1989, with 200 more RA starts by October 1991. The Office of Emergency and Remedial Response is using the enhanced capabilities of CERCLIS to track the progress toward the satisfaction of the section 116 requirements.

Contract Initiatives

In order to provide for proactive management of the Superfund contract program, EPA established the Contract Operations Review and Assessment Staff (CORAS) in FY88. The mission of CORAS is to assist OERR in the management of the Superfund program's hazardous waste clean-up activities, focusing on activities undertaken through contracts, interagency agreements, cooperative agreements, and grants. During June and July, CORAS conducted several assessments of the adequacy of contractor financial reporting.

In FY88, EPA began implementation of the Alternative Remedial Contract Strategy (ARCS). The ARCS program injects more contractors into the remedial contracting pool, providing incentive for improved performance and promoting project continuity. EPA awarded the first ARCS contracts in Regions 3 and 5 in January 1988, and as of the end of FY88 had awarded 18 of the anticipated 45 contracts.

Minority Firm Participation in Superfund Contracting

Total minority contracting for FY88 was $39 million. The Agency employed an extensive program to identify additional minority firms for potential opportunities as either Superfund prime contractors or subcontractors. The program included the following activities:

- Identification of qualified minority firms through screening of the Minority Business Development Agency's Profile System;
- Conducting hazardous waste clean-up training programs in four major cities nationwide;
- Sponsoring a minority procurement conference and minority business enterprise/women's business enterprise training workshops; and
- Conducting Congressional workshops on the Superfund procurement progress at the request of several U.S. Representatives.

Federal Facility Compliance with Superfund Requirements

EPA continued to focus special attention on improving compliance with requirements under CERCLA at federal facilities. The Agency negotiated model interagency compliance agreements for site remediation under CERCLA with both the Department of Defense and the Department of Energy in the summer of 1988. These agencies already have signed several agreements using the model, and negotiations are underway at more than 20 federal facility sites around the country. The Federal Facilities Task Force, established in FY87, made substantial progress in FY88, including publication of the Federal Agency Hazardous Waste Compliance Docket. This docket lists over 1,000 facilities targeted for preliminary assessments to determine the need for further investigations and possible listing on the NPL.

EPA Partnership with States and Indian Tribes

Thirty-five states and Puerto Rico entered into core program cooperative agreements (CPCAs) with EPA during FY88. CPCAs are negotiated and funded annually to help ensure that each state or Indian tribe has the funds to carry out CERCLA activities. OSWER issued final Guidance on State Core Program Cooperative Agreements on December 18, 1987. Also during the fiscal year, the Agency, with the help of the National Governors Association, completed draft guidance to assist states in meeting the hazardous waste capacity assurance requirements of CERCLA section 104(c)(9).

The Agency conducted three Indian Outreach Workshops for Indian tribes in June and July of 1988 covering all aspects of the Superfund program. In addition, EPA and the Navajo nation began negotiating a number of agreements including a CPCA supporting the newly established Navajo Superfund Office.

Public Participation

EPA awarded four Technical Assistance Grants (TAGs) during fiscal 1988. SARA established the TAG program, which provides up to $50,000 to eligible citizen groups, to obtain assistance in interpreting information related to activities at NPL sites.

From the time of publication of the TAG interim final rule in March 1988 until February 3, 1989, EPA Regional offices received 80 letters from citizens' groups expressing intent to apply for grants and 13 draft or final grant applications. Funds were first made available for TAGs in FY88.

Development of Treatment Technology

EPA announced on November 4, 1988, the selection of seven emerging technologies for funding under the Superfund Innovative Technologies Evaluation (SITE) program. The SITE program was established to promote the development and use of alternative technologies to address hazardous waste problems at Superfund sites. The program, a joint effort between OSWER and the Office of Research and Development (ORD), deals with technologies for recycling, separation, detoxification, destruction, stabilization, and hauling of hazardous chemical wastes. The emerging SITE program provides up to $300,000 in funding to an individual developer to assist in taking a promising technology from the bench to pilot stage.

In addition to the emerging program, the demonstration program addresses technologies which are further developed. These technologies are at pilot or full scale and ready to be tested on Superfund waste. There are 29 projects in the program, and during FY88, six technologies were demonstrated at Superfund sites across the country. At least 11 demonstrations are currently planned for fiscal 1989.

2.0 INTRODUCTION

2.1 Organization of the Report

This Report documents progress made by EPA toward implementing Superfund during 1988, with particular emphasis on cleanup activities. Accordingly, it is organized so that progress made in removal and remedial activities is presented before information concerning pre-remedial program activities, rather than in the sequence in which it occurs chronologically. Chapter 3.0 summarizes the removal and remedial program FY88 accomplishments and describes the process a site goes through during a removal or a remedial action. Chapter 4.0 presents the accomplishments of the pre-remedial program and describes the site discovery and assessment process. Chapter 5.0 explains the NPL listing process and provides information on sites added to and deleted from the list.

The Agency has also focused on increasing the role of PRPs in Superfund implementation during the fiscal year. Information on the enforcement program and the progress the program has made in effecting potentially responsible party cleanup of NPL sites comprises Chapter 6.0. Chapter 7.0 details participation of states and Indian Tribes in the Superfund process, and Chapter 8.0 describes mechanisms for community participation and the dissemination of Superfund information. Chapter 9.0 describes the components of the Agency's management infrastructure, resource utilization, and the major rulemakings undertaken during the fiscal year. Chapters 10.0 through 14.0 satisfy statutory requirements for reports on minority firm participation, the development of technologies, and the resources required to implement Superfund.

For purposes of brevity and consistency, when the acronym 'CERCLA' is used in the Report, it refers to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, by the Superfund Amendments and Reauthorization Act (SARA) of 1986. When Rulemakings or other *Federal Register* publications are discussed in the text, the citations for them have not been included in the text. Instead, all FY88 *Federal Register* publications related to Superfund are listed in Appendix D. The list includes citations for each entry. In addition, all references used in preparing the Report and citations for each of these references are included in Appendix G.

The sources for the information in each exhibit in the Report are included in the exhibit. The primary source for all of the data included in this Report is the CERCLA Information System (CERCLIS).

2.2 Statutory Requirements for the Report

In addition to providing an overview of EPA FY88 progress in implementing CERCLA, this Report includes the following information specifically required by CERCLA sections 301(h)(1)(A) through (G), 105(f), and 301(h)(2):

- In response to the requirement of section 301(h)(1)(A) to include a detailed summary of each feasibility study, Appendix B contains an abstract of each record of decision completed during FY88.

- The status and estimated date of completion of each feasibility study and remedial action, required by sections 301(h)(1)(B) and (F), are summarized in section 3.3. The status of enforcement actions and a comparison of FY88 enforcement actions with those undertaken in previous years is included in Chapters 3.0 and 6.0. Appendix A contains detailed information concerning the status and estimated time of completion of each feasibility study and remedial investigation. The appendix also provides information required by Section 301(h)(1)(C) concerning remedial actions that will not meet previously published schedules.

- The evaluation of newly developed technologies required by section 301(h)(1)(D) is described in Chapter 11.

- A discussion of the progress made in reducing the number of facilities subject to 5-year reviews under section 121(c), required by section 301(h)(1)(E), is included in section 3.3. Section 3.3 also contains information that satisfies the requirements of section 121(c) to report to Congress: (1) a list of facilities for which such a review is required; (2) the results of reviews; and (3) any actions taken as a result of such reviews.

- The resource estimates for completion of CERCLA implementation, required by section 301(h)(1)(G), are included in Chapter 14.

- Chapter 10 satisfies the section 105(f) requirement that EPA describe the participation of minority firms in contracts carried out under CERCLA.

- The report conducted under section 301(h)(2) by the EPA Inspector General on the reasonableness and accuracy of this Report to Congress is found in Appendix F.

3.0 RESPONSES AT SITES WITH HAZARDOUS SUBSTANCE RELEASES

CERCLA gives the federal government authority to respond to uncontrolled releases of hazardous substances and to develop long-term solutions to the nation's gravest hazardous waste problems. CERCLA provides for a broad program of reporting, investigation, and response to releases or threats of releases of any hazardous substance, pollutant, or contaminant that may present an imminent and substantial danger to public health, welfare, or the environment.

Two different programs have been developed that use Fund money to respond to releases of hazardous substances. The removal program uses Fund money in short-term responses to releases or threats of releases that pose a danger to human health or the environment. The remedial program, which is divided into three separate phases -- the pre-remedial phase, the remedial action phase, and the operation and maintenance phase -- uses Fund money to address non-emergency situations and problems that are too complex to be addressed by removal actions.

3.1 Removal Actions

Status Report on Removal Actions

The removal program, which is authorized under CERCLA section 104(a), was created to provide an authority to respond to incidents or sites involving releases or threats of releases of hazardous substances that present a danger to human health or the environment. In fiscal 1988, more removal actions were started and completed than in any previous fiscal year. Prior to FY88, the record high for removal action completions was 229 in FY84 and the record high for removal action starts was 304 in FY87, as shown in Exhibit 3.1-1. There were 282 removal actions completed and 328 removal actions started in FY88. Removal actions are undertaken on a continuous basis throughout the year. Consequently, many removals that were completed in FY88 were started in previous fiscal years, and many FY88 starts will be completed in future fiscal years.

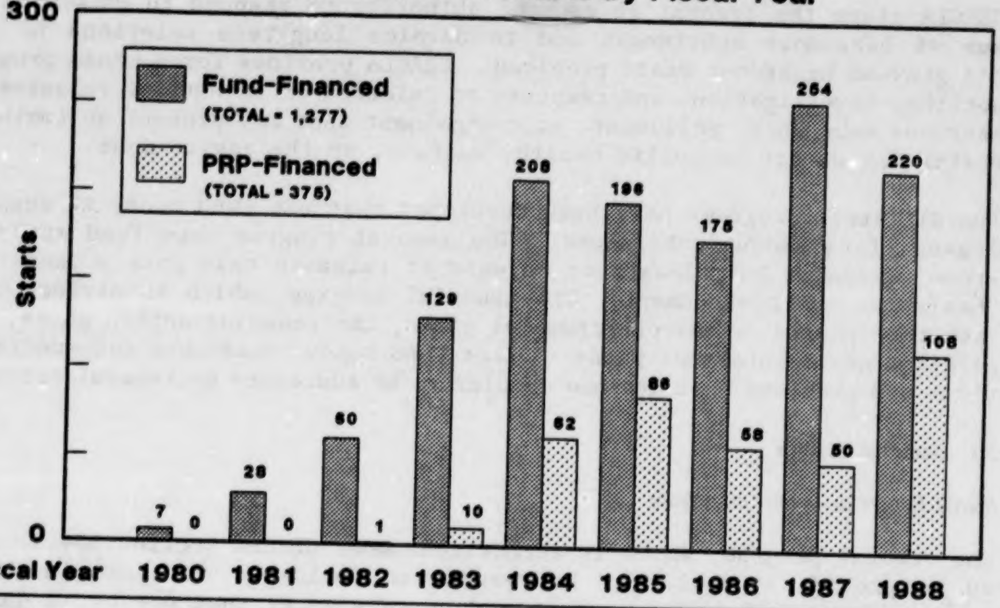
Of the removal actions started in the fiscal year, 220 were or are being financed with money from the Trust Fund; 53 are at sites listed or proposed for listing on the NPL. 208 of the removal actions completed in the fiscal year were financed with Fund money; 46 at sites listed or proposed for listing on the NPL. At the end of the fiscal year, there were 318 removal actions in progress. Exhibit 3.1-2, lists, by state, the number of removals financed by Superfund and by PRPs. The Agency exceeded its FY88 targets for removal action starts in all but two Regions (5 and 9) and spent less money than was obligated for conducting removal actions during the fiscal year in all Regions.

PRPs initiated 108 (33 percent) of the 328 removal action starts for the fiscal year. Of the 108 PRP-lead starts, 26 were at sites listed or proposed for listing on the NPL. In addition, PRPs oversaw and funded 74 (26 percent) of the 282 removal actions that were completed in the fiscal year. Of the 74 PRP lead completions, 17 were at sites listed or proposed for listing on the NPL.

Removals are generally short-term responses intended to stabilize or clean up releases. Chemical spills or fires, and illegal disposal of toxic materials (midnight dumping), are examples of emergencies that might warrant a removal

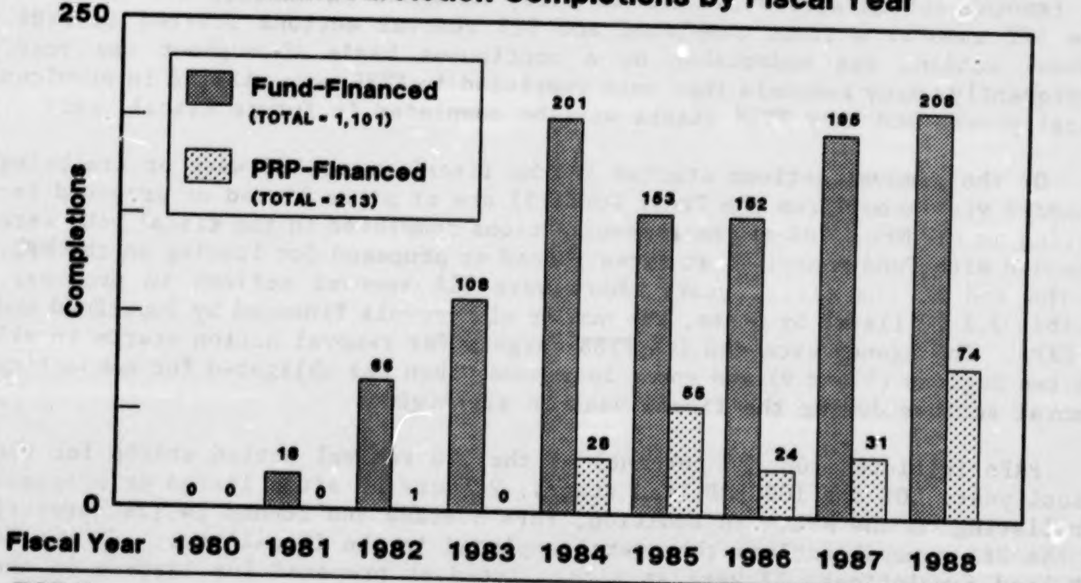
Exhibit 3.1-1

Removal Action Starts by Fiscal Year



TOTAL	7	28	61	139	270	282	233	304	328	1,652

Removal Action Completions by Fiscal Year



TOTAL	0	18	67	108	229	208	176	226	282	1,314

SOURCES: CERCLIS; Report to Congress on Progress Toward Implementing Superfund: Fiscal Year 1987, OERR, April, 1988.

Exhibit 3.1-2

Fiscal 1988 Removals By State

Region	State	Fund- and PRP-Financed Starts	Fund- and PRP-Financed Completions
1	Connecticut	2	2
	Maine	4	2
	Massachusetts	13	13
	New Hampshire	5	6
	Rhode Island	1	1
	Vermont	0	0
	Total	*25 (5)*	*24 (10)*
2	New Jersey	16	10
	New York	21	14
	Puerto Rico	0	0
	Virgin Islands	0	0
	Total	*37 (8)*	*24 (5)*
3	Delaware	3	2
	District of Columbia	0	0
	Maryland	1	3
	Pennsylvania	38	26
	Virginia	5	3
	West Virginia	6	15
	Total	*53 (15)*	*49 (8)*
4	Alabama	4	3
	Florida	10	8
	Georgia	11	8
	Kentucky	13	11
	Mississippi	4	4
	North Carolina	13	14
	South Carolina	6	6
	Tennessee	1	1
	Total	*62 (11)*	*55 (11)*
5	Illinois	2	3
	Indiana	8	6
	Michigan	9	9
	Minnesota	1	0
	Ohio	11	9
	Wisconsin	3	5
	Total	*34 (8)*	*32 (5)*

NOTES: *Expedited response actions (ERAs) are removals conducted at sites with remedial action underway. Throughout the text of this Report, ERAs have been included in the total of removal actions started in FY88. The total of removals in this exhibit does not include ERAs. Seven ERAs were started in FY88. Thus, 321 + 7 = 328, the total number of removal starts for FY88. ( ) = Number of proposed and final NPL sites.

SOURCE: CERCLIS.

Exhibit 3.1-2

Fiscal 1988
Removals By State

(continued)

Region	State	Fund- and PRP-Financed	
		Starts	Completions
6	Arkansas	3	2
	Louisiana	4	4
	New Mexico	2	1
	Oklahoma	2	3
	Texas	13	8
	Total	*24 (10)*	*18 (8)*
7	Iowa	2	3
	Kansas	3	3
	Missouri	26	21
	Nebraska	2	1
	Total	*33 (3)*	*28 (5)*
8	Colorado	6	9
	Montana	4	4
	North Dakota	0	0
	South Dakota	1	0
	Utah	3	2
	Wyoming	6	3
	Total	*20 (5)*	*18 (6)*
9	American Samoa	0	0
	Arizona	1	3
	California	14	12
	Commonwealth of Marianas	2	0
	Guam	0	0
	Hawaii	0	0
	Nevada	2	2
	Trust Territories	0	0
	Total	*19 (4)*	*17 (4)*
10	Alaska	2	2
	Idaho	6	8
	Oregon	3	2
	Washington	3	5
	Total	*14 (3)*	*17 (2)*
TOTAL ALL REGIONS		*321 (72)*	*282 (64)*

SOURCE: CERCLIS.

action. EPA conducts removal actions at a wide range of sites including inactive waste sites and active manufacturing or waste disposal facilities. The sites where removal actions are conducted may or may not be listed or proposed for the NPL. Some sites are placed on the NPL after removal actions have been taken. Specific activities undertaken during a response might include treatment, excavation, pumping, incineration, barrier installation, provision of an alternate water supply, or temporary relocation of residents.

The breakdown of fund-financed removals by incident category has shown some variation. For example, the percentage of removal actions conducted in response to midnight dumping has remained fairly constant, reaching a high of 27 percent in 1987 and a low of 22 percent in both 1983 and 1986. The percent of removals conducted at active production facilities has also remained fairly constant, fluctuating between 6 and 8 percent. The percent of removals conducted at inactive waste management facilities has generally decreased over time. In 1983, 42 percent of all removal actions were conducted at inactive waste management facilities. In 1986, 16 percent of all removal actions were undertaken at inactive waste management facilities, and in 1988, 18 percent of fund-financed removals were conducted at inactive waste management facilities. The percentage of removals conducted at inactive production facilities and in response to other types of incidents (i.e., transportation related incidents, active waste management facilities, and miscellaneous incidents) has fluctuated from 27 percent in 1983 to 17 percent in 1987 to 28 percent in 1988.

Because the purpose of removal actions is to respond to more immediate threats that require short-term actions, removals generally do not deal with long-term environmental problems like area-wide contamination of ground water. Section 104(a) of CERCLA, however, emphasizes that removal actions should be consistent with longer-term remedial actions. SARA, by amending section 104(c) of CERCLA, also increased the limits on removal actions from six months and $1,000,000 to one year and $2,000,000. Extensions may be granted if continued action is judged to be otherwise appropriate and consistent with planned remedial action.

3.1.1 Types of Removal Actions

EPA has established three categories of removal actions based on the urgency of the situation. Incidents or sites requiring immediate attention are considered classic emergencies. Sites that require attention within six months are classified as time-critical. Sites where attention is not required for at least six months are deemed non-time-critical.

Emergencies such as fires and explosions and time-critical removals at NPL sites and time-critical removals that do not fall under any other response authority are the removal program's highest priorities. In a March 31, 1988, guidance memorandum, the Office of Solid Waste and Emergency Response (OSWER)explained that Regions may have to defer non-time-critical removal actions in order to ensure that sufficient funds remain available to address classic emergencies. OSWER emphasizes that non-time-critical removals should be financed using remedial funds made available through enforcement activities. The Regions are also advised to encourage other parties (i.e., PRPs, state, and local governments) to conduct removal actions. Whenever time permits, EPA attempts to identify PRPs and have them implement the removal action. If this is not feasible prior to undertaking an action, or if the PRP is unwilling to carry out the action, EPA can conduct the removal and pursue cost recovery at a later date.

3.1.2 The Removal Action Process

Once EPA receives notification of a release that potentially warrants a removal action, the Agency conducts a removal preliminary assessment. Based on the results, the Agency can choose to take any of several actions. It can decide to perform an emergency removal, a time-critical removal, a non-time-critical removal, or take no further action. Alternatively, if the situation warrants, it can refer the site to the remedial program, the state, or the PRP.

3.1.2.1 Emergency and Time-Critical Removals

Because timely response is necessary to eliminate the threat posed by the release, the normal methods of choosing the appropriate response action and of informing the public of the action are initially forgone when conducting emergency removals. After the response is underway or before beginning a time-critical response, however, the Agency is required to prepare an action memorandum that outlines the authority under which the removal is being conducted and that describes and justifies the action being taken. The Agency also must establish an administrative record that contains the documents that form the basis for the selection of the response action.

3.1.2.2 Non-Time-Critical Removals

When the Agency determines that a release warrants a non-time-critical removal action, the response personnel conduct an engineering evaluation/cost analysis (EE/CA), and the response alternatives identified in the EE/CA are made available to the public in the administrative record. The action memorandum is signed and the removal action is performed.

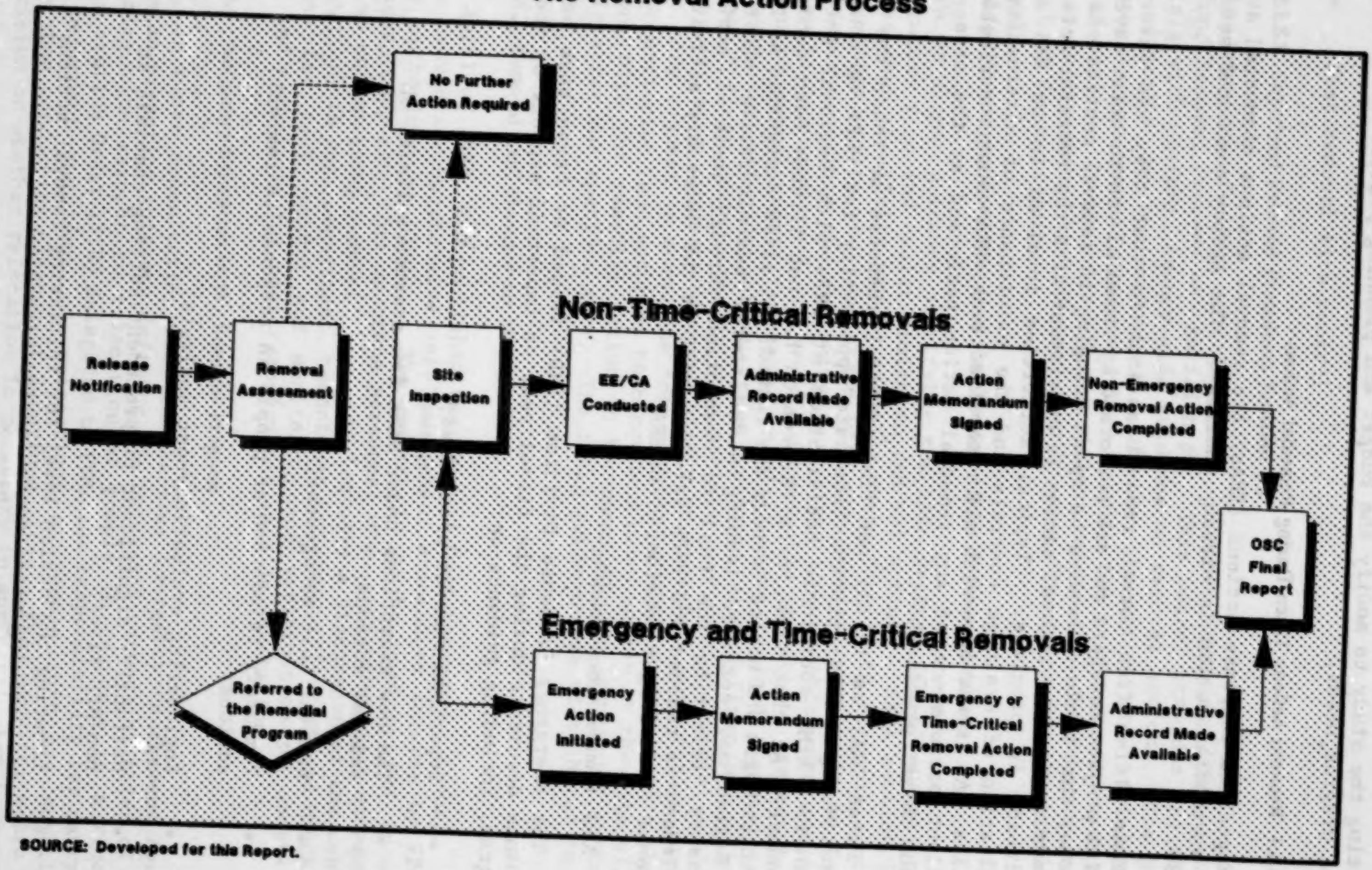
When a removal action is completed, the On-Scene Coordinator (OSC) is required to submit a report on the response that accurately records the situation at the site as it developed, the actions taken at the site during the response, the resources committed for the response, and the problems encountered while undertaking the response. The Agency may decide during or after the response to further evaluate conditions at the site to determine whether remedial action is warranted. Exhibit 3.1-3 illustrates the steps taken when conducting a removal action.

3.1.3 The Removal Actions Universe Study

The Agency completed a Removal Action Universe Study in FY88. The study is an in-depth review and analysis of historical removal action types, duration, and cost. The study looks at 625 Fund-financed removal actions that were initiated from FY85 through the second quarter of FY88, and identifies trends in removal activities and obligations. For example, the study reveals that most removal actions cost less than $50,000 and take more than 90 days to complete. The study also shows that classic emergency removal actions are generally less expensive to conduct than time-critical or non-time-critical removal actions. EPA plans to use the information that it gathered while

Exhibit 3.1-3

The Removal Action Process


No Further Action Required
Non-Time-Critical Removals
Release Notification
Removal Assessment
Site Inspection
EE/CA Conducted
Administrative Record Made Available
Action Memorandum Signed
Non-Emergency Removal Action Completed
OSC Final Report
Emergency and Time-Critical Removals
Referred to the Remedial Program
Emergency Action Initiated
Action Memorandum Signed
Emergency or Time-Critical Removal Action Completed
Administrative Record Made Available

SOURCE: Developed for this Report.

conducting the study to modify the budget and planning process to better meet removal program needs.

3.1.4 Removal Actions Taken During Remedial Actions

Expedited response actions (ERAs) are removal actions conducted at sites where a remedial action is already underway. The Agency conducted seven ERAs in FY88.

ERAs differ from normal removal actions in that they are directed by remedial project managers and are performed by remedial contractors, saving time and money that would otherwise be spent bringing in removal contractors. ERAs also ensure that the removal action is consistent with the remedial action that is already in progress. Typical activities involved in an ERA are the installation of drainage controls and the maintenance of alternative water supplies. As is the case with all removal actions, ERAs must contribute to the efficient performance of any remedial action performed at the site, to the maximum extent practicable.

In an ERA, as in all non-time-critical response actions, the Remedial Project Manager (RPM) provides adequate opportunity for PRPs to conduct the response. RPMs coordinate notification of PRPs with Regional enforcement personnel. At that time, if a PRP search has not already been conducted, a search is begun and notice letters are issued. At sites designated as PRP-lead, the Region may consider issuing a unilateral administrative order or, if necessary, referring the case to resolution through judicial action. If settlement is reached and PRPs agree to perform the necessary activities, the response is no longer considered an ERA.

3.1.5 Removal Action Guidance

The Emergency Response Division (ERD) issued or began work on several guidance documents during the fiscal year on important aspects of the removal program, including guidance on:

- Superfund removal procedures;
- The new exemptions under SARA for statutory limits on removal actions;
- Removal cost management;
- Temporary relocation of people in response to removal actions;
- Engineering evaluation/cost analysis;
- Nationally significant or precedent-setting removals at non-NPL sites;
- Lowering the action level for initiating removal actions at drinking water contamination sites;

- File management; and
- Post-removal site control.

3.1.5.1 Superfund Removal Procedures Revision #3

In February of 1988, the Emergency Response Division (ERD) published *Superfund Removal Procedures, Revision #3*. This manual provides EPA response officials with uniform, Agency-wide guidance on removal actions. The purpose is to describe in one manual all of the procedural and administrative requirements for removal actions. As a result, the guidance addresses a wide array of topics. It includes NCP definitions relevant to the program, removal policies as determined by OERR, and step-by-step directions for preparation and approval of documentation.

3.1.5.2 Consistency Exemption from the Statutory Limits on Removal Actions

EPA developed guidance clarifying the SARA section 104(c) exemption from the statutory time and dollar limits on removal actions. SARA section 104(c) specifies that the limits may be exceeded where "continued response action is otherwise appropriate and consistent with the remedial action to be taken." The guidance describes the following four situations in which the use of the exemption is "appropriate:" to avoid a foreseeable threat; to prevent further migration of contaminants; to use as an alternative to land disposal; or to comply with the off-site policy. The guidance also defines an action as "consistent" if it contributes in some positive way to the remedial action to be taken, or, at a minimum, does not hinder or interfere with future remedial actions. Any request to enact the "consistency" exemption should cite the new exemption criterion, and document both how continued action at the site will be consistent with the remedial action to be taken and why continued action is appropriate for the specific site. The final guidance was distributed in June 1989.

3.1.5.3 Removal Cost Management Manual

In April of 1988, ERD published the *Removal Cost Management Manual*. This document provides comprehensive cost management procedures for use by EPA at removals authorized by CERCLA. The manual is to be used by the On-Scene Coordinator (OSC) and other on-scene personnel when performing cost management activities at Superfund removal sites. It includes a discussion of the concept and an approach to cost management, techniques for cost projection and tracking, techniques for cost control and monitoring and verification of contractor charges, and techniques for cost recovery and cost documentation.

3.1.5.4 Temporary Relocation in the Removal Program

ERD, in close consultation with the Federal Emergency Management Agency (FEMA) began preparing guidance defining the roles and responsibilities of the two agencies with respect to relocation of people in response to a removal action. Executive Order 12580 delegated to FEMA the responsibility for carrying out the permanent and temporary relocations of people that are sometimes necessary when conducting cleanup of Superfund sites. EPA, however, makes the final decision on whether relocation is necessary in any particular instance.

3.1.5.5 Engineering Evaluation/Cost Analysis

ERD issued a guidance outline on EE/CAs on March 30, 1988. The EE/CA is similar to an RI/FS in that it focuses on the analysis of response alternatives. EPA is currently revising the EE/CA guidance. The Agency also hopes to provide, through the EE/CA, better documentation on the selection of specific removal actions and a vehicle for improved public participation in removal actions.

3.1.5.6 Nationally Significant or Precedent-Setting Removals at Non-NPL Sites

EPA made substantial progress towards completing guidance that identifies certain removals at non-NPL sites as nationally significant or precedent-setting. When a removal action is deemed nationally significant or precedent-setting, the Regions must obtain Headquarter's approval before conducting the action. The guidance identifies the following removals as nationally significant or precedent setting: (1) removals affecting other sovereign nations and Indian lands; (2) removals involving pesticide contamination, dioxin, consumer products in consumer use, and asbestos; and (3) removals involving the statutory exclusions or limitations in CERCLA.

3.1.5.7 Removal Action Levels at Drinking-Water Contamination Sites

On April 19, 1988, the Agency issued interim final guidance recommending a new action level for response to contamination of a drinking water supply. ERD based the new action level on the drinking water equivalent level (DWEL) established by the Safe Drinking Water Act, and on the 10^{-4} lifetime excess cancer risk level established by the Superfund program as the minimum level to which sites containing carcinogenic contamination must be remediated. In the guidance, the Agency also recommends removal actions at sites where the numeric action level is not exceeded, but where site-specific factors present serious health risks to the public. ERD expects to issue final guidance concerning removal action levels at drinking water contamination sites in 1989, after revising the interim guidance to reflect the Office of Drinking Water's new policy concerning rounding health advisory numbers.

3.1.5.8 File Management

In July of 1988, ERD issued guidance on file management entitled *Model Program for Removal Site File Management*. This guidance instructs OSCs and administrative support staff in the requirements for on-site file management at removal sites. It contains a kit and a list of contents for successful establishment of permanent files.

3.1.5.9 Post-Removal Site Control

In July of 1988, the Agency also issued a draft policy statement clarifying its position on post-removal site control. Post-removal site control refers to the activities that must be continued upon completion of a removal action in order to ensure the success of the action, for example, relighting gas flares, replacing filters, and collecting leachate. The policy statement emphasizes that the removal program should not perform post-removal site control. Instead, OSCs should make provisions before initiating the action to ensure that any such site control will be adequately performed by either the state or local government, a PRP, or, in certain cases, the remedial program.

Also, the FY88 update to *The Superfund Emergency Response Actions Summary (Volume III)* is scheduled for publication and distribution in June 1989. The summary will provide the removal location, NPL status, threats present, mitigative actions undertaken, and cost of the action for all removals completed throughout the history of the program.

3.2 The Remedial Program

During the fiscal year, the Agency made greater progress in implementing the remedial program as a whole than in any other year of Superfund's history. Through the remedial program, EPA develops and implements long-term solutions for the nation's most hazardous sites. The remedial program's success demonstrates that Superfund is not only comprehensive, but also effective.

As shown in Exhibit 3.2-1, the remedial stage of the Superfund process encompasses a number of cleanup phases. After a site has been listed on the National Priorities List (NPL), an RI/FS is generally conducted. Next, the lead agency designs and implements the selected remedy in the remedial design (RD) and remedial action (RA) phases, respectively. After the cleanup is complete and the site has been deleted from the NPL, the site remedy may be monitored and periodically reviewed. For the purpose of highlighting the environmental results of the remedial program, the description in this section of the Report first focuses on the remedial phases that involve field work and later describes the investigatory phases of the program.

3.2.1 Remedial Action

The Agency completed 31 remedial actions (RAs) in FY88, among them 19 (61 percent) first completions, 5 (16 percent) subsequent completions, and 7 (23 percent) final completions. Of the 31 RAs that the Agency completed, 20 (65 percent) were Fund-financed, and 11 (35 percent) were PRP-financed.

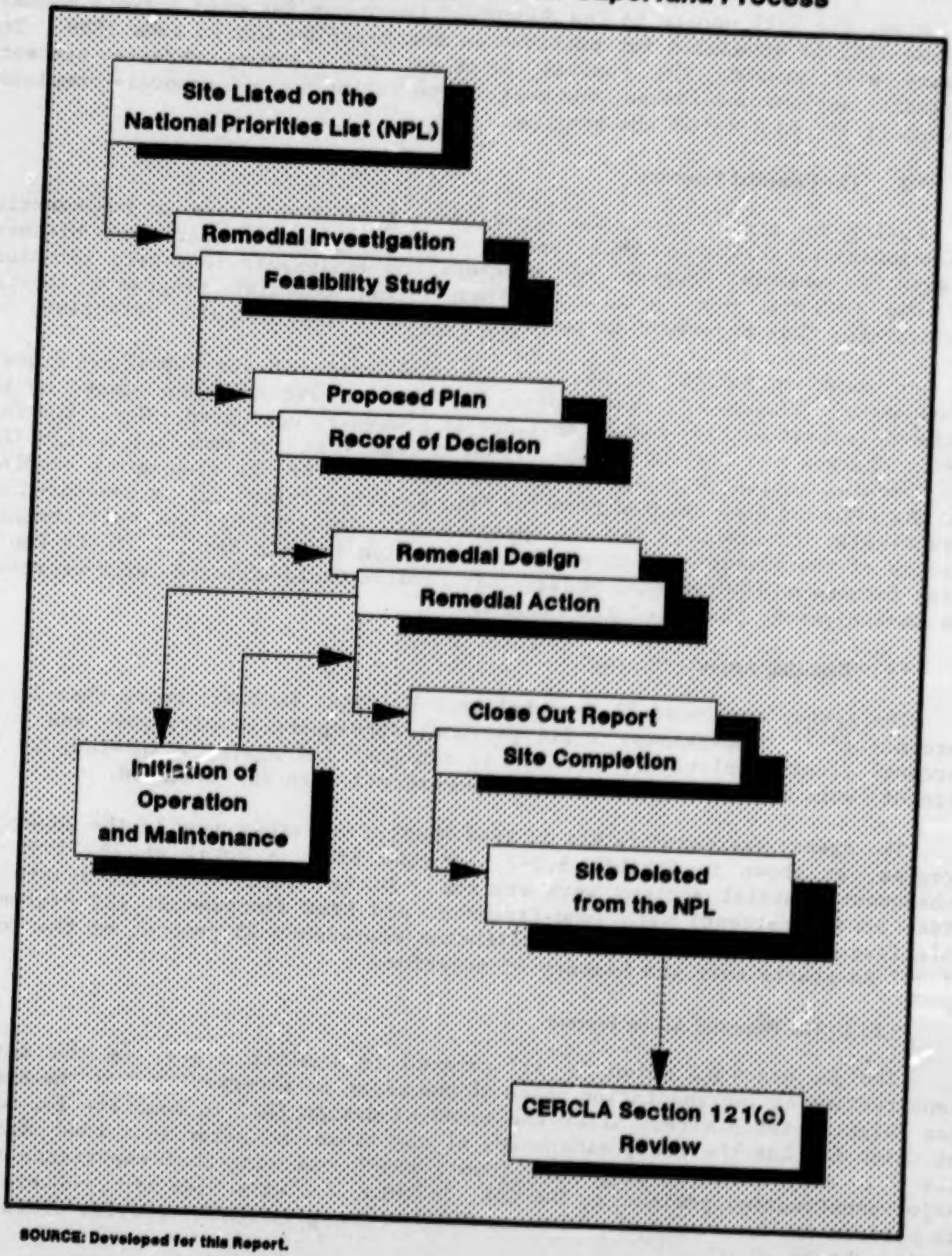
The Agency started more RAs in FY88 than in any other year of the Superfund program, as shown in Exhibit 3.2-2. During FY88, a total of 72 first and subsequent remedial actions were started. Of the total of 72 RA starts for FY88, 51 (71 percent) were Fund-financed, and PRPs financed 21 (29 percent). This fiscal year's level of accomplishment represents 35 percent of the total of 207 RA starts over the history of Superfund.

3.2.1.1 The Remedial Action Process

The RA process, which is illustrated in Exhibit 3.2-3, is the actual construction or implementation phase of the clean-up alternative that the Agency has selected for a site. After the remedial design (RD) is complete for sites at which EPA has the lead, management of the clean-up action is turned over to the U.S. Army Corps of Engineers (COE), which has long-term experience with major construction projects. The COE, in turn, solicits bids from contractors to perform the RA work. EPA Remedial Project Managers (RPMs) provide oversight during the RA.

Exhibit 3.2-1

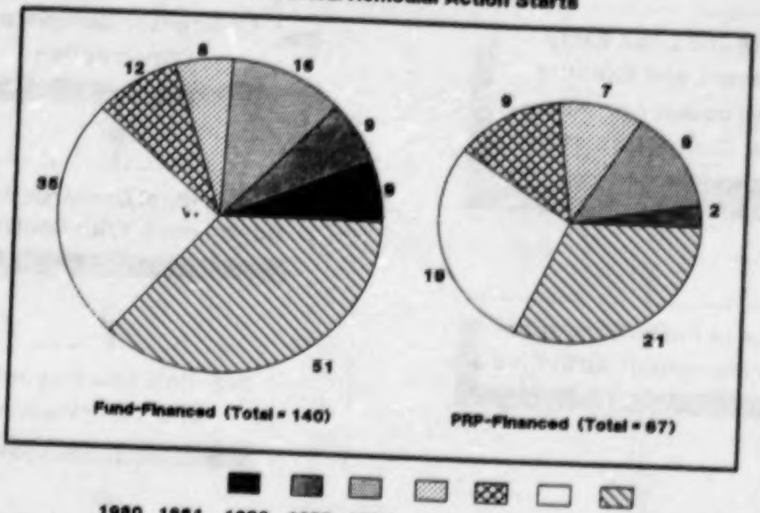
The Remedial Stage of the Superfund Process


Site Listed on the National Priorities List (NPL)
Remedial Investigation
Feasibility Study
Proposed Plan
Record of Decision
Remedial Design
Remedial Action
Initiation of Operation and Maintenance
Close Out Report
Site Completion
Site Deleted from the NPL
CERCLA Section 121(c) Review

SOURCE: Developed for this Report.

Exhibit 3.2-2

Historical Remedial Action Starts



	1980	1981	1982	1983	1984	1985	1986	1987	1988	TOTAL
Fund	0	0	9	9	16	8	12	35	51	140
PRP	0	0	0	2	9	7	9	19	21	67
TOTAL	0	0	9	11	25	15	21	54	72	207
(%)	(0)	(0)	(4)	(5)	(12)	(7)	(10)	(26)	(35)	(99)

NOTE: Accomplishments shown are totals of first and subsequent actions. Percentages total less than 100 percent because of rounding.

SOURCES: CERCLIS; Report to Congress on Progress Toward Implementing Superfund: Fiscal Year 1987, OERR, April 1988.

State-lead RA work is initiated through a cooperative agreement with the Agency. In order to expedite the RA, EPA encourages states to retain the same architectural or engineering firm that provided services for the remedial investigation/feasibility study (RI/FS). PRP-lead and -financed RA work is initiated through a settlement agreement with EPA. Whenever possible, EPA negotiates with PRPs to undertake the expense of design and construction work.

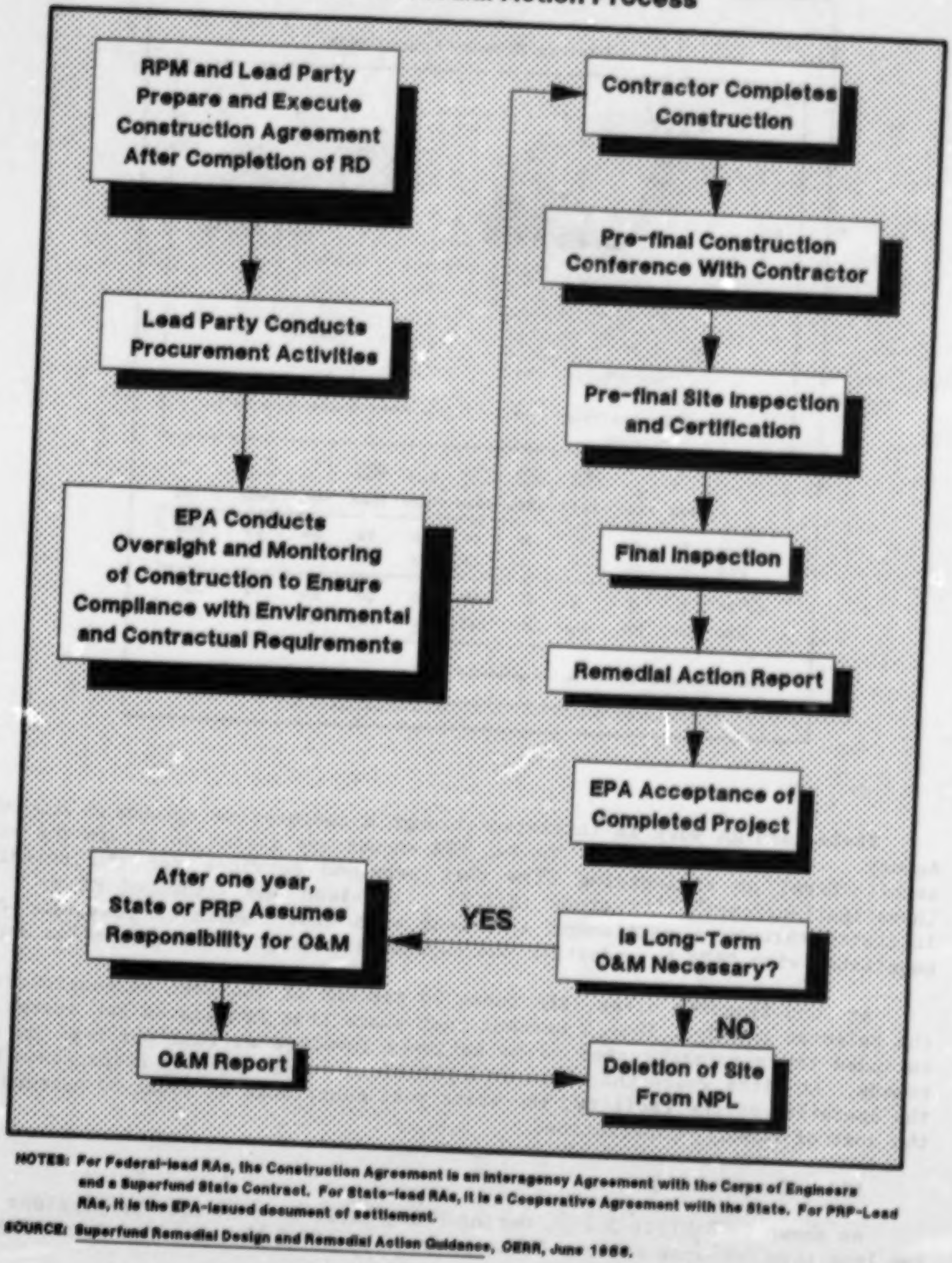
At Fund-financed sites, EPA funds 90 percent of the cost of constructing the selected remedy. The 10 percent cost share that EPA leaves for states is intended to encourage states to be actively involved as full partners in the remedy. At sites where the state or a political subdivision is responsible for the operation of the facility, the state must contribute at least 50 percent of the cost of remedy construction.

3.2.1.2 Completed Projects

As shown in Exhibit 3.2-4, during FY88, there were 24 site completions and two long-term response actions (LTRAs), for a total of 26 completions and LTRAs.

Exhibit 3.2-3

The Remedial Action Process


RPM and Lead Party Prepare and Execute Construction Agreement After Completion of RD
Lead Party Conducts Procurement Activities
EPA Conducts Oversight and Monitoring of Construction to Ensure Compliance with Environmental and Contractual Requirements
Contractor Completes Construction
Pre-final Construction Conference With Contractor
Pre-final Site Inspection and Certification
Final Inspection
Remedial Action Report
EPA Acceptance of Completed Project
Is Long-Term O&M Necessary?
YES
NO
After one year, State or PRP Assumes Responsibility for O&M
O&M Report
Deletion of Site From NPL

NOTES: For Federal-lead RAs, the Construction Agreement is an Interagency Agreement with the Corps of Engineers and a Superfund State Contract. For State-lead RAs, it is a Cooperative Agreement with the State. For PRP-Lead RAs, it is the EPA-issued document of settlement.

SOURCE: *Superfund Remedial Design and Remedial Action Guidance*, OERR, June 1986.

Exhibit 3.2-4

Site Completions During Fiscal 1988

Activity/Site Name	State	Region
Noticed for Deletion		
Matthews Electroplating	Virginia	3
New Castle Steel	Delaware	3
Presque Isle	Pennsylvania	3
A.L. Taylor	Kentucky	4
Galloway Pits	Tennessee	4
Lee's Lane	Kentucky	4
Mowbray Engineering	Kentucky	4
Newport Dump	Kentucky	4
Toftdahl Drum	Washington	10
Completed Close Out Reports Awaiting Publication of Deletion Notice		
Cooper Road	New Jersey	2
Krysowaty Farm	New Jersey	2
New Castle Steel	Delaware	3
Wade (ABM)	Pennsylvania	3
Big River Sand	Kansas	7
Jibboom Junkyard	California	9
Long-Term Response Actions		
Sylvester	New Hampshire	1
Tar Creek	Oklahoma	6
Completed Final Actions Awaiting Completion of Close Out Reports		
South Brunswick Landfill	New Jersey	2
Taylor Borough	Pennsylvania	3
Paramore Surplus	Florida	4
Triana	Alabama	4
Charlevoix Municipal Well Field	Michigan	5
Norman Poer Farm	Indiana	5
Northern Engraving	Wisconsin	5
Peterson Sand and Gravel	Illinois	7
LaBounty	Indiana	7

SOURCE: Superfund Site Completions and Deletions from the National Priorities List, HSCD/OERR, October 25, 1988.

In FY88, EPA deleted five sites from the National Priorities List (NPL) (see Exhibit 5.2-1). Over the history of the Superfund program, there have been 18 final deletions.

In September 1988, the Agency issued a draft guidance, *Procedures for Completion and Deletion of National Priorities List Sites*. The guidance focuses on the technical and procedural requirements for determining site completion and for deleting sites from the NPL. The guidance does not address sites that are removed from the NPL to be deferred to a clean-up authority other than CERCLA, nor does it address completions at proposed NPL sites.

According to the guidance, following implementation of all appropriate remedial actions, an NPL site is classified as either a completion or a long-term response action (LTRA). Both completions and LTRAs require that all activities identified in the ROD for remedial sites or the action memorandum for removal sites be implemented and performed according to clean-up requirements and design specifications. All pathways of exposure must be addressed.

Long-term response actions are activities that require continued on-site activity for an indefinite period of time before the clean-up levels specified in the ROD or action memorandum are achieved for one or more pathway of exposure. Site completion occurs at the point where clean-up levels are achieved, and no further remedial activity is required or appropriate at the site to protect human health or the environment.

Protection can be provided through treatment, containment or removal of waste, provision of an alternate water supply, or use of institutional controls. According to the Completion and Deletion guidance, it is not necessary that all waste be treated or removed, as long as protection is achieved. Generally, the methods of protection for a site will be determined in the ROD.

In cases where waste has been left on site, the review procedures established in section 121(c) of SARA (see section 3.2.1.4 below) will continue to be appropriate regardless of the completion or deletion status of the site. Following site completion, it may still be necessary to perform some operation and maintenance (O&M) activities to maintain the integrity of the remedy. O&M must be performed by either the state or PRPs.

EPA Headquarters and states have the opportunity to comment on completion decisions through review of the *Superfund Site Close Out Report* for the site. The *Close Out Report* represents a modification made this year to completion policy. The *Close Out Report* provides a brief, technical demonstration of how the implemented remedy at the site satisfies the completion requirements.

The exact format and contents of the report will vary, depending on the site conditions, but the report should address the following components:

- Summary of site conditions;
- Demonstration of quality control for clean-up actions;
- Data that demonstrate achievement of clean-up levels;

- Summary of O&M;
- Data that demonstrate protectiveness; and
- A bibliography of site documents.

For Fund-lead and PRP-lead sites, the Region prepares the *Close Out Report*, and the Regional Administrator approves it. For state-lead sites, the state may elect to prepare the report, but the Regional Administrator's approval is still required.

3.2.1.3 Site Operation and Maintenance

Operation and Maintenance (O&M) is the final phase in the remedial process. A state or a PRP conducts O&M activities at a site after a response action occurs to ensure that the cleanup or containment system is functioning properly and to maintain the integrity of completed remedial actions. O&M begins at a site after a remedy has been completed.

For Fund-financed actions, the Fund pays 90 percent of the costs of O&M activities for the first year after an action is implemented, and the state pays the remaining 10 percent. This funding arrangement is intended to ensure that the remedy is put in place and functioning properly. At sites where a state or political subdivision was responsible for operation of the facility, EPA's contribution to the cost of O&M in the first year may be 50 percent or less. After the first year, however, all O&M costs are paid by the state.

SARA modified CERCLA section 104 to include new requirements for sites with Fund-financed remedial actions that involve treatment or other measures to restore contaminated ground or surface water quality to a level that assures protection of human health and the environment. The operation of such treatments for a period up to 10 years after the construction or commencement of operation is considered remedial action. The Fund, therefore, pays up to 90 percent of the costs of the treatment for a period of up to 10 years. Activities required to maintain the effectiveness of such treatment following the 10-year period or after remedial action is complete, whichever is earlier, are considered O&M.

The RI/FS report and the ROD indicate the types of O&M activities required for a site and provide estimates of their costs. O&M activities may include collection and treatment of ground water or leachate, maintenance of water monitoring units, and overall site upkeep. At the completion of Fund-financed O&M activities, the state prepares and submits an O&M Report to EPA. The report includes a description of O&M activities performed, the results of site monitoring, and a description of any additional activities to be undertaken. For PRP-funded O&M activities, the O&M Report may include additional elements.

As more sites become eligible for monitoring, accomplishment data for this phase will be examined. The Agency plans to publish a guidance document on O&M.

3.2.1.4 Sites to be Reviewed Under CERCLA Section 121(c)

EPA carefully monitors sites over the long-term to ensure that their remedies are fully protective of human health and the environment. CERCLA section 121(c) directs periodic review of sites where remedial action leaves hazardous substances, pollutants, or contaminants above health-based levels on site. According to section 121(c), the review must take place at least every five years after the initiation of remedial action. A review must also be conducted at each site where a substance remains on site if the standards initially used to define protective levels are subsequently changed. CERCLA section 121(c) requires that a report be sent to Congress that lists the facilities for which periodic reviews are required, the results of all the reviews, and any action taken as a result of the reviews.

The Agency is presently developing its policy on the frequency and scope of section 121(c) review. Even sites that have been deleted from the NPL may be reviewed. The Agency is presently conducting a review to determine at which of these deleted sites contaminants exceed health-based levels. Exhibit 3.2-5 is a list of these potential sites only. In addition, the Agency may decide to review a small number of sites where remedial action has been initiated and has continued for at least five years, and where contaminants remain on site above health-based levels. Thus, Exhibit 3.2-5 may not be a definitive list of the sites to be reviewed. The Agency does not plan to review non-NPL sites where removal actions have been taken. Contents of site review will vary from site to site, based on the complexity of the problems at the site. Work plans and fact sheets for the review guidance document were completed just after the close of FY88.

The Agency has identified certain procedures to be followed to carry out the review provisions of CERCLA section 121(c). If the concentration of contaminants left on a site completed after the enactment of SARA exceeds established levels, OSWER proposes to conduct a review to ensure that the remedy continues to be protective of human health and the environment. If the periodic review shows that a site remedy is no longer protective of human health and the environment, additional action to mitigate the threat will be evaluated and taken. This approach is consistent with clean closure under the Resource Conservation and Recovery Act (RCRA). Reviews will be conducted at sites currently considered to have "safe" levels of contaminants if and when standards defining protective levels are changed. The level of review will be determined by the extent to which these new standards indicate that these sites are then considered to have consequently "unsafe" levels of contamination.

In FY89, EPA will propose a policy defining the sites where the reviews must be conducted and establishing the purpose of the review. The application of this policy will be affected by the progress made in implementing remedies that adhere to the clean-up standards specified in section 121 of CERCLA. When OSWER finalizes the policy for implementing section 121(c), operating procedures will be established for tracking, re-examining, and collecting information on site status. The policy will ensure that no site at which hazardous substances remain on site above health-based levels will be deleted from the NPL until at least one review has been conducted at it and the Agency has determined that the remedy remains protective. OSWER will also establish procedures for determining the progress made in reducing the number of facilities subject to review under

Exhibit 3.2-5

Potential Sites to be Reviewed Under CERCLA Section 121(c) as of September 30, 1988

Site Name	State	Region
Sites Deleted Before the Enactment of SARA		
1. Chemical Metals	Maryland	3
2. Chemical Minerals	Ohio	5
3. Gratiot County Golf Course	Michigan	5
4. Luminous Process	Georgia	4
5. Walcott Chemical	Mississippi	4
Sites Deleted After the Enactment of SARA		
1. Enterprise Avenue	Pennsylvania	3
2. Friedman Property	New Jersey	2
*3. Harris (Farley Street)	Texas	6
4. Lehigh Electric and Engineering	Pennsylvania	3
*5. Middletown Road Dump	Maryland	3
6. Morris Arsenic Dump	Minnesota	5
*7. Mountain View Mobile Homes	Arizona	9
8. PCB Spills	North Carolina	4
9. PCB Warehouse	Mariana Islands	9
10. PCB Wastes	Pacific Islands	9
11. Taputimu Farm	American Samoa	9
*12. Tri-City Oil Conservationist	Florida	4
*13. Varsol Spills	Florida	4

NOTES: * Deleted in FY88. The Agency is conducting a review to determine at which of these sites contaminants exceed health-based levels. EPA plans to review sites at which remedial action or operation and maintenance has started for possible inclusion on the final list of sites to be reviewed. A final list will be issued when this review is complete.

SOURCE: Superfund Site Completions and Deletions from the National Prorities List, HSCD/OERR, October 25, 1988.

section 121(c). Progress in this area will be dependent upon an increase in selection of source-control remedies that include treatment.

The proposed revised NCP addresses how EPA could use RODs to specify the need for frequent or specific reviews of the remedy selected. For example, the ROD might specify that the site be reviewed when a certain technology unavailable at the time that the ROD was signed becomes available.

3.2.2 Remedial Investigations/Feasibility Studies

The Agency and PRPs completed 152 RI/FSs in FY88, among them 112 (74 percent) first completions and 40 (26 percent) subsequent completions. These fiscal year accomplishments are illustrated in Exhibit 3.2-6. EPA and PRPs started a total of 150 remedial investigation/ feasibility studies (RI/FSs) in the FY88. Of the total of 150 RI/FS starts for FY88, 93 (62 percent) were Fund-financed, and PRPs financed 57 (38 percent). This fiscal year's level of accomplishment represents 16 percent of the total of 938 RI/FS starts over the history of Superfund. Historical RI/FS starts are illustrated in Exhibit 3.2-7.

In addition, of the total of 152 RI/FS completions in FY88, the Fund financed 102 (67 percent), and PRPs financed 50 (33 percent). These RI/FS start and completion accomplishments reflect the Agency's continued emphasis throughout the history of the program to initiate responses that are funded by PRPs, whenever possible.

Of the total of 150 RI/FS starts during FY88, 101 (67 percent) were first starts, and 49 (33 percent) were subsequent starts. An RI/FS first start is the first plan initiated for a site to scope a permanent solution to the containment problem. (For a full description of operable units and first and subsequent starts, see below).

3.2.2.1 The Remedial Investigation/Feasibility Study Process

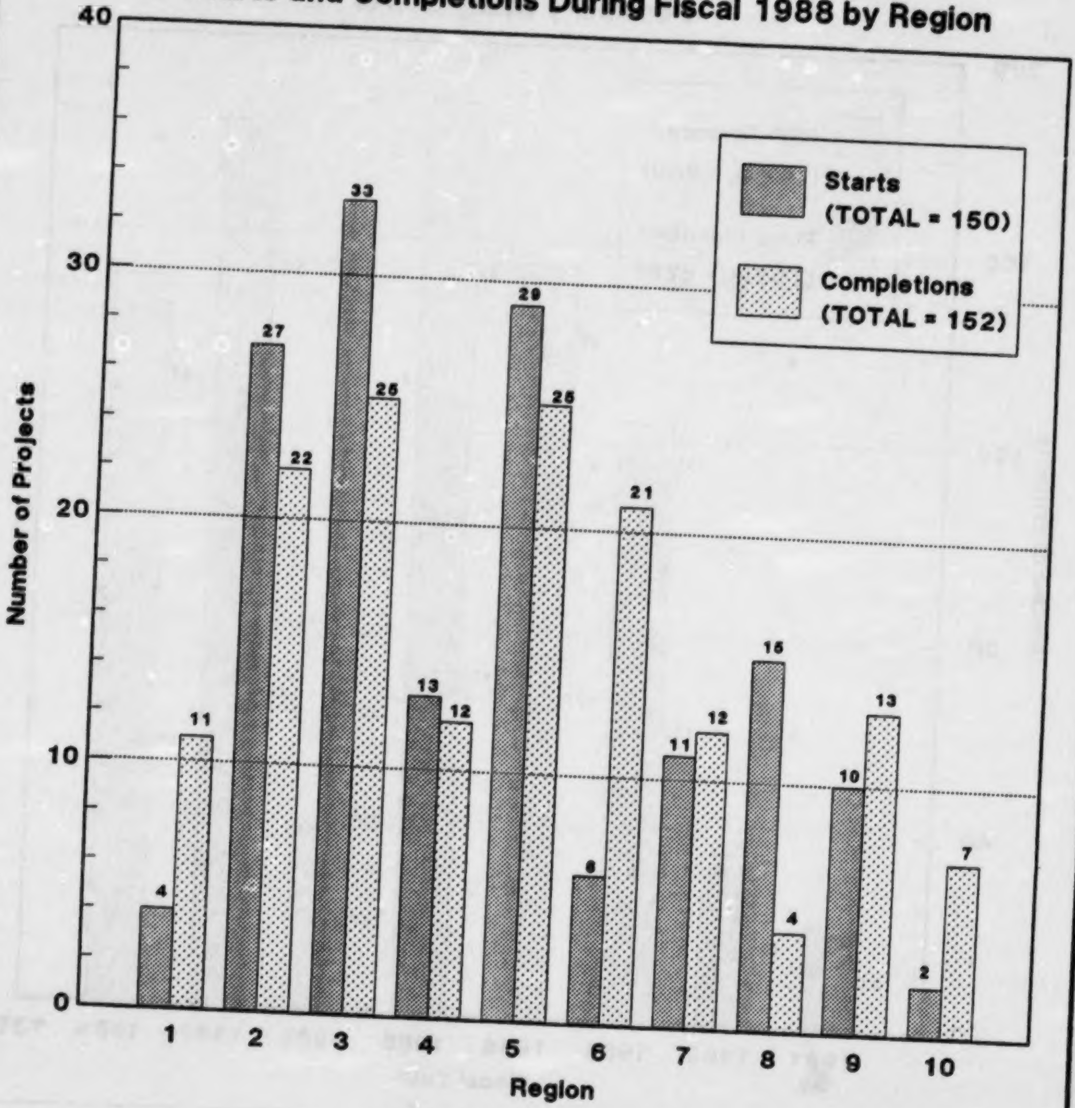
At the start of each remedial site cleanup, EPA conducts an RI/FS to better define problems at hazardous waste sites that appear to present risks and to evaluate options for addressing those problems. The RI/FS process is illustrated in Exhibit 3.2-8. The Agency considers the RI and the FS to be concurrent but distinct processes. The data that are collected in the RI influence the development of appropriate clean-up alternative approaches in the FS, but the RI and the FS are not simply sequential phases of a single process. Instead, the stages of the RI/FS process feed into each other and often occur simultaneously. The RI/FS process should be tailored to match the scope and nature of the problem at each site. Before the lead agency begins the RI/FS, it conducts a scoping phase, during which it develops work plans and other project plans for the site, including one for community relations.

The RI is the process of defining the nature and extent of the threat presented by the contamination at a site, and it includes the following activities:

- *Site characterization*, which is the actual field sampling and laboratory analyses of air, ground water, surface water, soil, and contaminants;
- *Baseline risk assessment*, which is the determination of the magnitude of the threats that are or may be posed by site contaminants in the absence of remedial action; and

Exhibit 3.2-6

Superfund Remedial Investigation/Feasibility Study Starts and Completions During Fiscal 1988 by Region

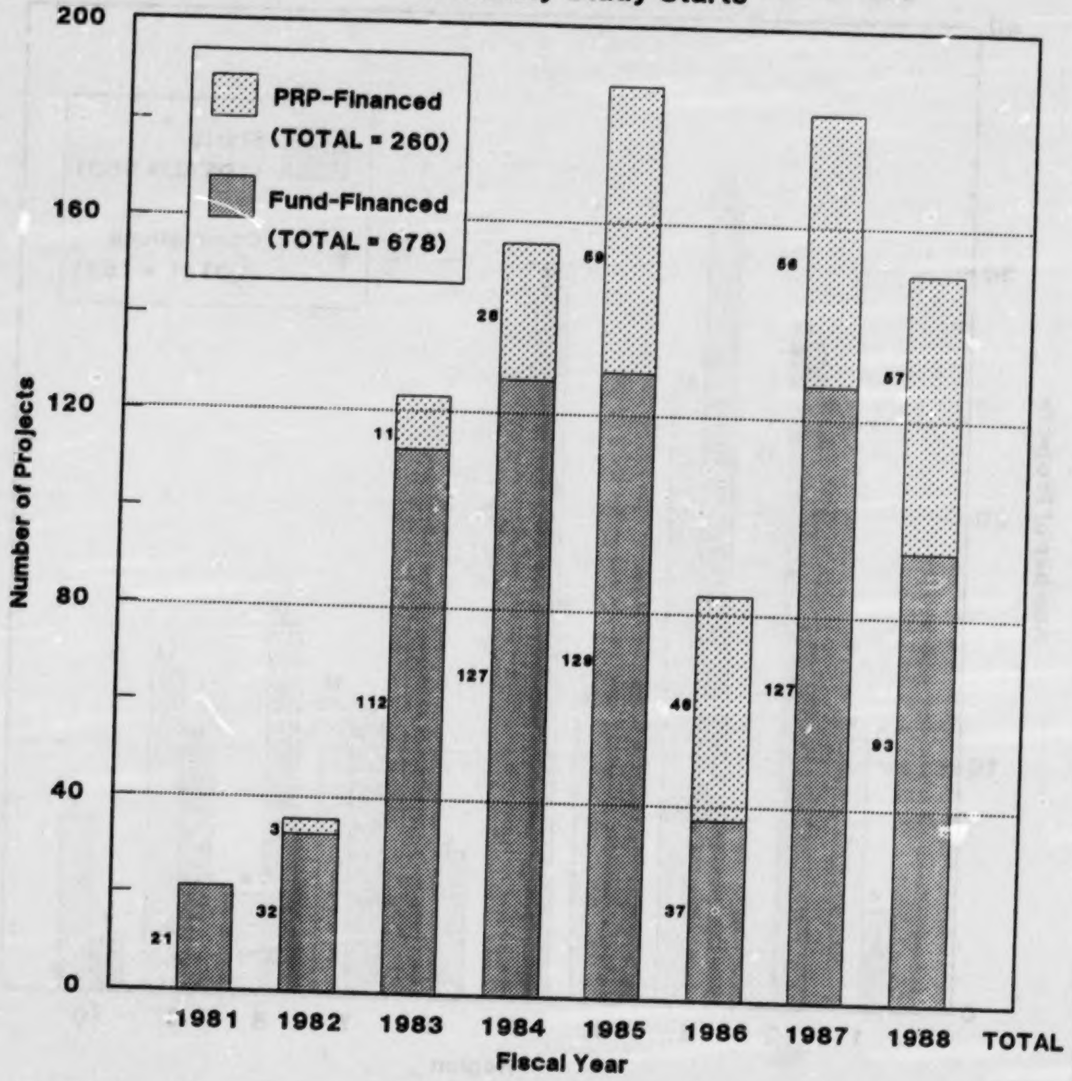


	Starts	Completions
Fund PRP	93 57	102 50
TOTAL	150	152

SOURCE: CERCLIS.

Exhibit 3.2-7

Historical Remedial Investigation/ Feasibility Study Starts



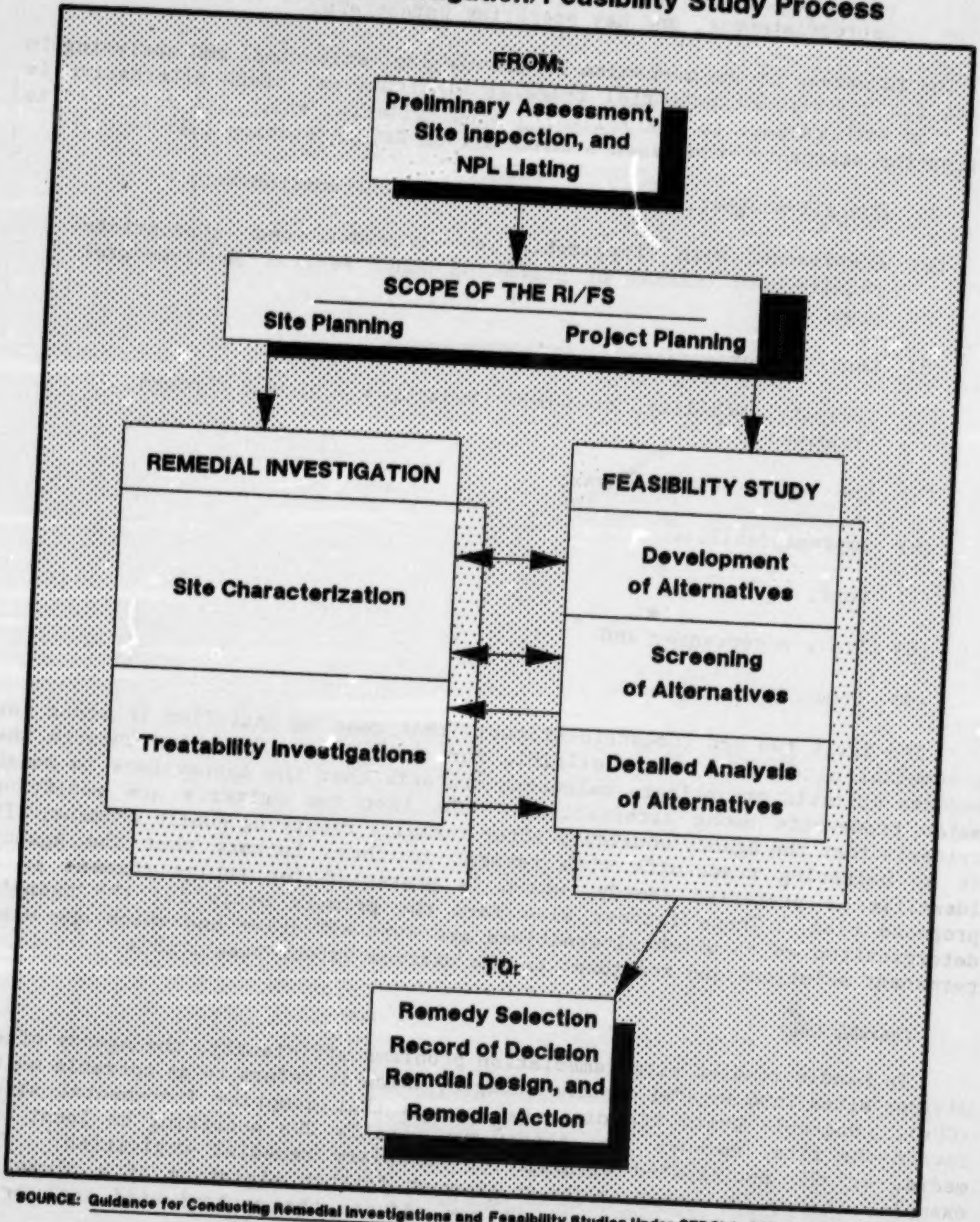
TOTAL	21	35	123	155	188	83	183	150	938
(%)	(2)	(4)	(13)	(17)	(20)	(9)	(20)	(16)	(101)

NOTES: Accomplishments shown are the sum of first and subsequent actions; percentages total more than 100 percent because of rounding.

SOURCES: CERCLIS; Report to Congress on Progress Toward Implementing Superfund: Fiscal Year 1987, OERR, April 1989.

Exhibit 3.2-8

The Remedial Investigation/Feasibility Study Process


FROM:
Preliminary Assessment, Site Inspection, and NPL Listing
SCOPE OF THE RI/FS
Site Planning
Project Planning
REMEDIAL INVESTIGATION
Site Characterization
Treatability Investigations
FEASIBILITY STUDY
Development of Alternatives
Screening of Alternatives
Detailed Analysis of Alternatives
TO:
Remedy Selection
Record of Decision
Remdial Design, and
Remedial Action

SOURCE: Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, OERR, March 1988.

- *Treatability investigations*, which are the bench, pilot, or full-scale tests of treatment technologies on samples of active site waste to determine their effectiveness, appropriateness, and key operating parameters.

The FS serves as the mechanism for developing, screening, and analyzing in detail the universe of potential remedial alternatives. Each alternative is evaluated with respect to the following nine criteria, which EPA developed to address the statutory requirements and goals of CERCLA section 121:

(1) Overall protection of human health and the environment;

(2) Compliance with applicable or relevant and appropriate requirements (ARARs) of state and other federal environmental laws;

(3) Long-term effectiveness and permanence;

(4) Toxicity, mobility, or volume reduction achieved through treatment;

(5) Short-term effectiveness;

(6) Implementability;

(7) Cost;

(8) State acceptance; and

(9) Community acceptance.

The first two are threshold criteria that must be satisfied in order for a remedial alternative to be eligible for selection. The third through the seventh criteria are primary balancing criteria that the Agency uses to weigh major trade-offs among alternatives. The last two criteria are modifying criteria that the Agency considers after formally receiving public comment. It is by balancing trade-offs with respect to these factors that the Agency identifies a preferred remedy, which is presented for public comment in a proposed plan. These factors also form the primary basis for the Ageny's determination as to which alternatives are cost-effective and which one uses permanent solutions and treatment to the maximum extent practicable.

Operable Units

To handle complex site remediation problems efficiently, the Agency often divides sites into several distinct stages, which it refers to as operable units (OUs). Operable Units are discrete actions that comprise incremental steps toward the final remedy. The Agency may specify OUs according to location, media, or the anticipated duration of necessary remedial activities. For example, it may implement an OU to prevent further migration of a plume of contaminants in ground water, or it may address the contaminated soil or a lagoon that is the primary source of contaminants at a site.

The Agency often designates OUs at a site at the start of or during the RI/FS, but it does not always conduct the remediation of each operable unit simultaneously. After the Agency chooses a remedy for an operable unit, the remedial design phase usually follows for that particular action, and then the Agency begins the construction of the remedial action.

The Agency refers to the first OU for which it obligates funds to begin remedial work as the first start and to the obligation of funds for the OUs that follow as subsequent starts.

Many events influence the progress of an OU through the Superfund process, and taking the OU approach to site cleanup enables EPA to effectively set priorities and to provide better overall project management by promoting rapid risk reduction for the most pressing remediation activities.

3.2.2.2 Streamlining the Remedial Investigation/Feasibility Study Process

In general, over the course of Superfund, the costs and durations of remedial activities have increased. EPA has accelerated the pace of site cleanups, but there remains Agency-wide concern about finding ways to further accelerate the pace so that the burdens on the Fund can be reduced.

Remedial Investigation/Feasibility Study Cost Study

During FY88, the Agency completed an *RI/FS Cost Study* to determine the reasons for cost growth and to evaluate plans for controlling costs. The two-volume study included the following qualitative and quantitative findings:

- Costs of federal-lead sites are higher than costs at state-lead sites;
- Costs vary from Region to Region;
- Regional cost variation, however, has little impact on project duration;
- Work plan costs are relatively constant, regardless of total project costs;
- PRP negotiations have significant impacts on RI/FS costs; and
- Changes in RPM and contractor personnel can significantly increase RI/FS costs.

The cost study recommended that the average cost of an RI/FS be reduced to $250,000 per operable unit. One way that these costs can be lowered is by speeding up sample collection by doing more screening on site. The conclusion of the cost study was that remedial project managers (RPMs) need better cost estimation and project management tools. Accordingly, the Agency is developing an *RI/FS Cost Compendium*, which it expects to complete in FY89. The *Cost Compendium* will serve RPMs as a reference for evaluating initial project cost and level of effort (LOE) estimates and contractor proposals at the scoping phase of the RI/FS, in light of historical cost data.

Key Management Initiatives

The recommendations of the *RI/FS Cost Study* are also addressed by the implementation of the *Alternative Remedial Contracts Strategy* (ARCS). By the end of FY88, EPA completed ARCS negotiations for all Regions and awarded ARCS contracts in Regions 2, 3, and 4. In addition, the Agency awarded an ARCS contract in the zone consisting of Regions 6, 7, and 8.

ARCS is a major remedial project support activity that was introduced in FY87. (For a full description of ARCS, see section 9.2 of this Report). Central to ARCS is the concept of promoting continuity of remedial performance from the RI/FS stage through construction management. The strategy is also designed to increase the level of competition for contract awards and the involvement of states in the clean-up process.

Under ARCS, EPA awards contracts in a two-step process. First, the Agency conducts negotiations with a pool of firms that it has selected as potential ARCS contractors. Then, it awards contracts to several firms from within the pool.

A second major remedial project support activity that EPA introduced in FY87 and further implemented in FY88 is the *RI/FS Improvements Initiative*. The Agency expects the initiative to improve the pace, technical quality, and cost-efficiency of the RI/FS process. In April 1988, the Agency distributed guidance to the Regions that focuses on the easily implemented, short-term goals of the initiative. EPA also established five workgroups to develop guidance for the more complex aspects of the initiative, such as program management, procurement, funding, and technical issues. Regional and Headquarters staff, state representatives, and contractors participated in the workgroups, and a steering committee oversaw their progress. The Agency expects to issue guidance in FY89 on this second phase of initiatives, based on the results of the workgroup's efforts.

Finally, EPA continued to develop the *Cost of Remedial Actions (CORA) Model* and the *Schedule for Cost Estimating Expert System* (SCEES), which have been designed to assist the Regions in estimating remedial costs. The developments focused on ways to make CORA and SCEES easier to use. The Agency plans to release SCEES to the Regions by the end of FY89. The systems provide the Regions with historical cost data to supplement their own Superfund program experience. The Agency established a CORA Hotline in FY88 to provide information and assistance with the system.

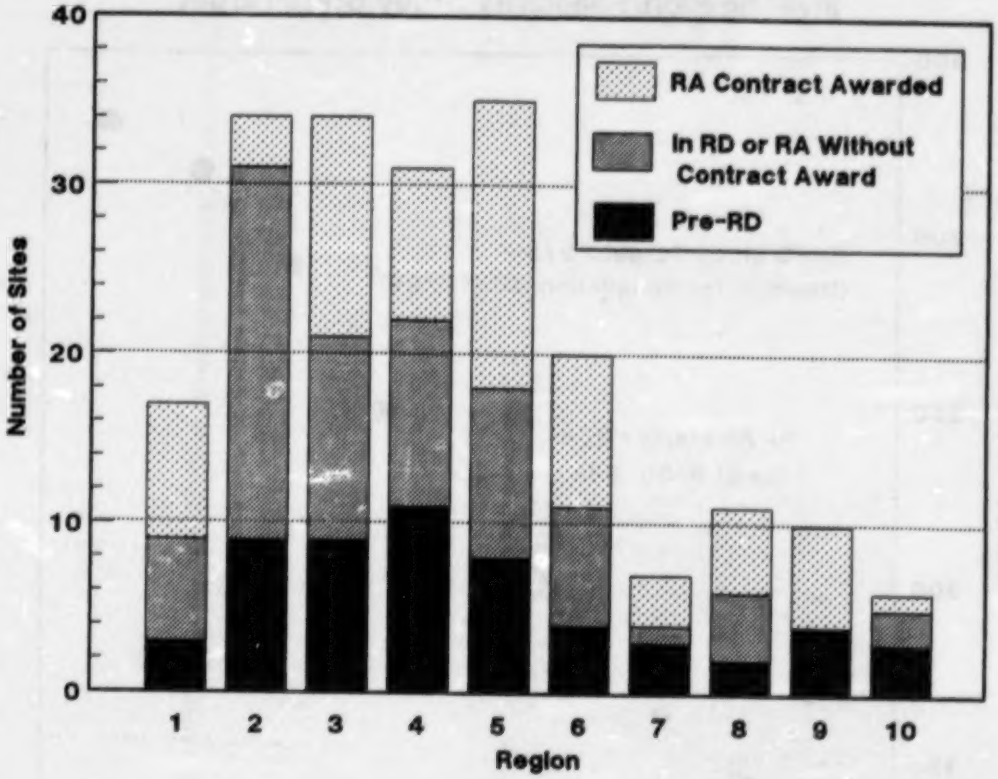
3.2.2.3 Strategy to Meet the CERCLA Section 116 Targets

By the end of FY88, EPA had awarded 74 contracts to perform RAs for sites on the 175 RA candidate list, or 42 percent of its CERCLA section 116 RA target. The Agency had also begun 224 RI/FSs, or 81 percent of its CERCLA section 116 RI/FS target. Accomplishments at sites on the 175 RA candidate list are shown in Exhibit 3.2-9. Progress toward meeting the section 116 RI/FS target is illustrated in Exhibits 3.2-10. Section 116 requires the Agency to:

- Start RI/FSs for at least 275 sites by October 1989; and

Exhibit 3.2-9

Fiscal 1988 Accomplishments at Sites on the 175 Remedial Action Candidate List



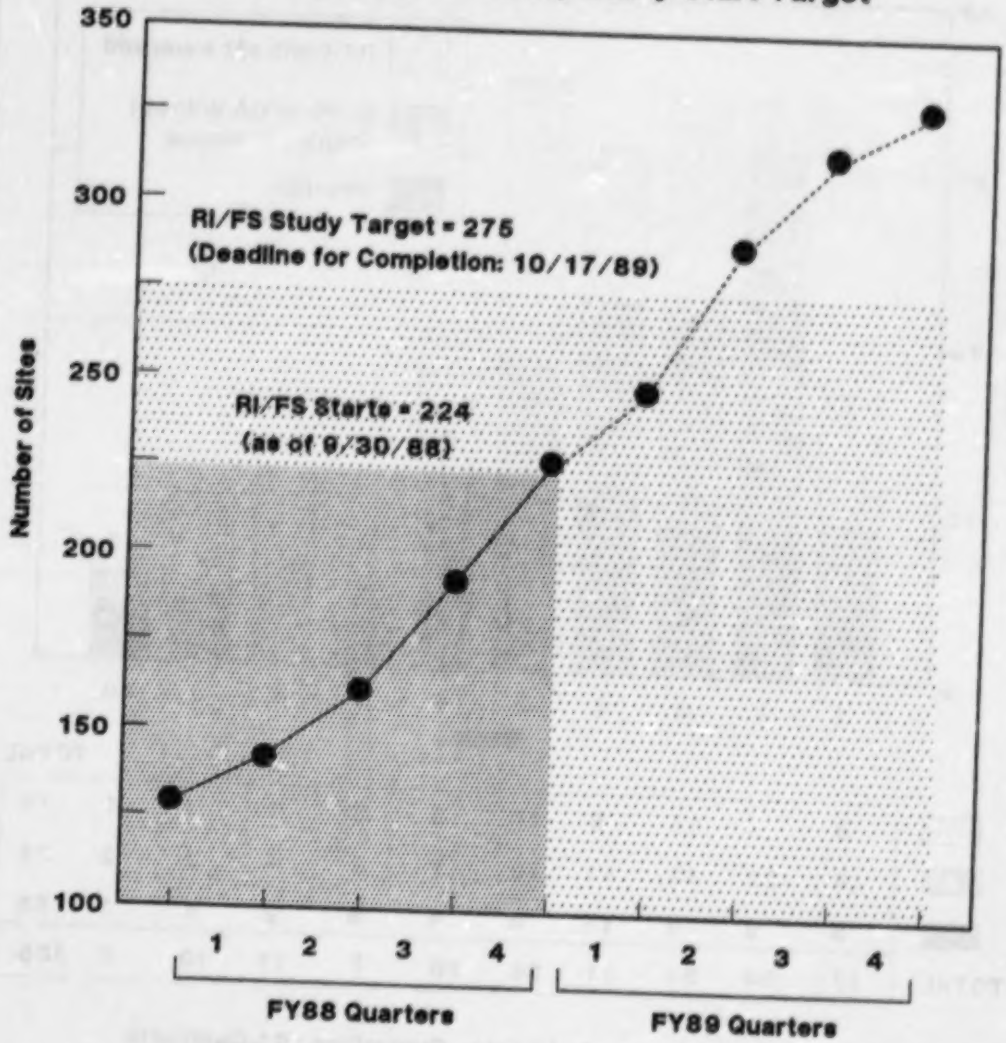
	1	2	3	4	5	6	7	8	9	10	TOTAL
░	8	3	13	9	17	9	3	5	6	1	74
▒	6	22	12	11	10	7	1	4	0	2	75
█	3	9	9	11	8	4	3	2	4	3	56
TOTAL	17	34	34	31	35	20	7	11	10	6	205

	Candidate Site	Cumualtive RD Starts	RA Contracts Awarded
Fund	117	88	43
PRP	88	61	31
TOTAL	205	149	74

SOURCE: CERCLIS.

Exhibit 3.2-10

Progress Toward Meeting the 275 Remedial Investigation/Feasibility Study Start Target



RI/FS Starts (as of 9/30/88)	Fund: 129 PRP: 95	TOTAL: 224

SOURCE: CERCLIS.

- Start RAs for at least 175 additional sites by October 1989, and an additional 200 by October 1991.

OSWER's strategy to meet the 175 RA target stresses the need to establish realistic schedules, meet established schedules, and set priorities among projects. Superfund decisionmaking must often proceed in the face of many scientific unknowns to meet the remedial schedules. In spite of these uncertainties, the program is making a concerted effort to meet statutory schedules and to comply with the goals they reflect.

3.2.2.4 Remedial Investigation/Feasibility Study Guidance

In October 1988, EPA issued an interim final *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA.* (The Agency had issued an interim draft guidance for use in March 1988.) The guidance describes the general process for conducting an RI/FS and provides an overall understanding of the role of the RI/FS in relation to other remedial process components. It also incorporates the key management initiatives that the Agency has designed to streamline the RI/FS process.

EPA plans to issue the final guidance documents in FY89 that will describe procedures for PRP participation in the RI/FS process and the policy to be followed by RPMs to properly initiate, control, and monitor PRP participation.

3.2.3 Status Report on Remedial Investigations, Feasibility Studies, and Remedial Actions

Under CERCLA sections 301(h)(1)(B) and (F), EPA must report to Congress the status and estimated completion date of each RI, FS, and RA project in progress at the end of FY88. Section 301(h)(1)(C) requires EPA to provide notice of RI/FSs that will not meet a previously published schedule for completion and to estimate new dates of completion. On September 30, 1988, 695 such projects were in progress at 580 sites. Among these 695 ongoing projects were 540 RI/FSs, 14 stand-alone FSs, 9 stand-alone RIs, and 132 RAs. These projects are listed in Appendix A.

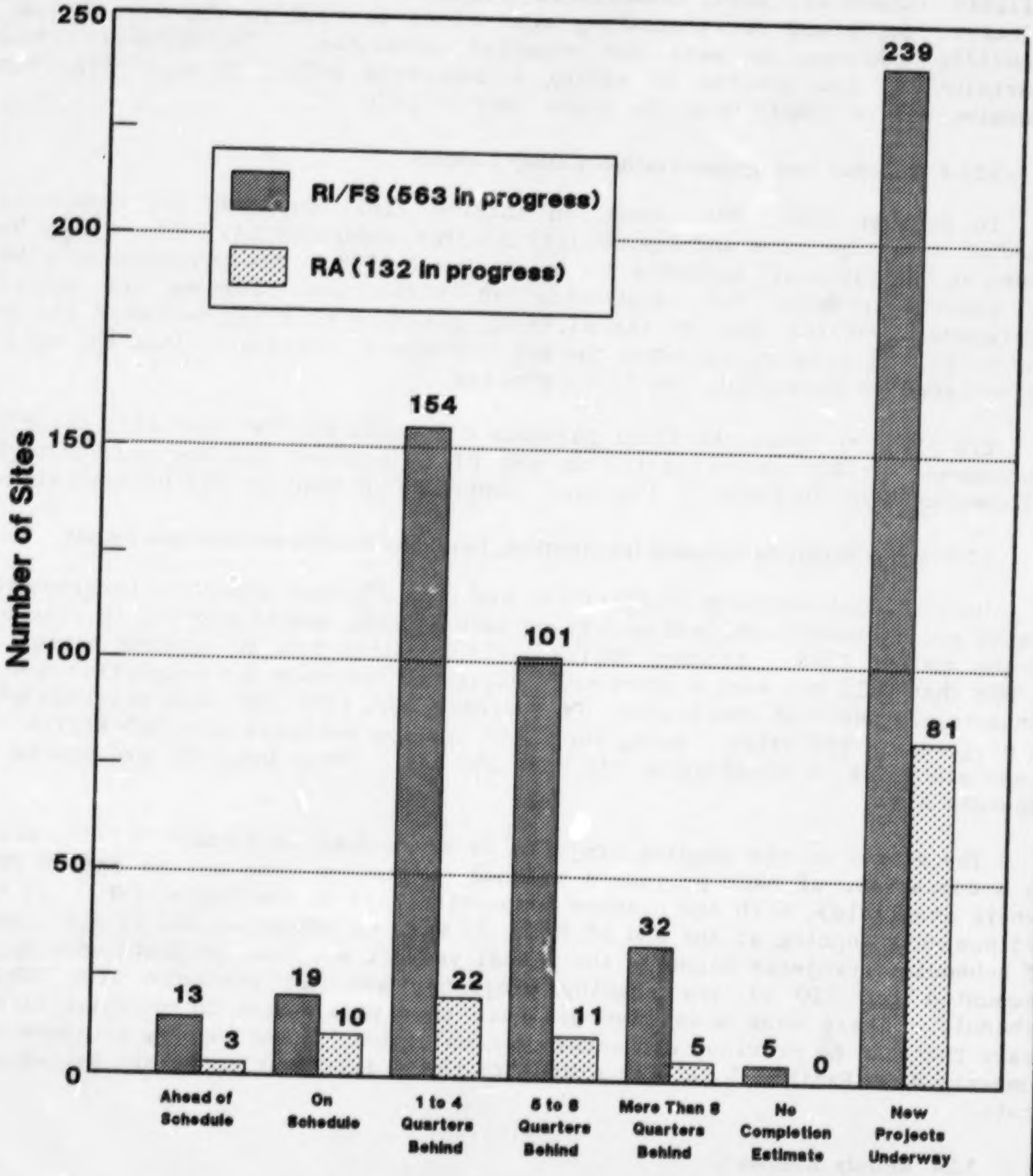
The status of the ongoing projects is summarized in Exhibit 3.2-11, based on a comparison of each project's planned completion date at the end of FY87 (where available), with its planned completion date at the end of FY88. Of the 695 projects ongoing at the end of FY88, 29 were on schedule, and 16 were ahead of schedule. Projects begun in the fiscal year (i.e., "new projects underway") accounted for 320 of the ongoing projects, and 325 projects were behind schedule. There were also five projects that were begun in previous fiscal years that had no previous estimates of completion. These ongoing projects are summarized in Exhibit 3.2-12 according to their distribution by EPA Region and state.

3.2.4 Remedy Selection

During FY88, the Agency signed a total of 152 Records of Decision (RODs), compared to the 75 RODs that the Agency signed in FY87. Exhibit 3.2-13 illustrates historical RODs. Of the 152 RODs signed during FY88, 102 (67 percent) were Fund-lead, and PRPs lead 50 (33 percent). The ROD is issued by the lead agency as the final remedial action decision document. As such, the

Exhibit 3.2-11

Status of Ongoing RI/FS and RA Projects at the End of Fiscal 1988



NOTE: Remedial investigation/feasibility study totals include stand-alone remedial investigation and stand-alone feasibility studies, in addition to the traditional RI/FS units. New projects are projects begun in FY88, although funding may have been allocated in prior fiscal years.

SOURCE: CERCLIS

Exhibit 3.2-12

Distribution of Ongoing Remedial Investigation, Feasibility Study, And Remedial Action Projects at the End of Fiscal 1988 by Region and State

Region	State	RI/FSs	RIs	FSs	RAs	Sites
1	Connecticut	3	0	0	3	4
	Massachusetts	17	0	1	2	14
	Maine	5	0	0	1	6
	New Hampshire	6	1	2	0	8
	Rhode Island	5	0	0	2	6
	Vermont	1	0	0	0	1
	Total	*37*	*1*	*3*	*8*	*39*
2	New Jersey	48	0	2	12	56
	New York	43	1	0	15	48
	Puerto Rico	6	0	0	0	6
	Total	*97*	*1*	*2*	*27*	*110*
3	Delaware	7	0	0	1	8
	Maryland	2	0	0	1	3
	Pennsylvania	43	0	0	13	50
	Virginia	11	0	0	1	12
	West Virginia	0	0	0	2	2
	Total	*63*	*0*	*0*	*18*	*75*
4	Alabama	5	0	0	3	6
	Florida	17	0	1	6	23
	Georgia	2	0	0	0	2
	Kentucky	3	0	0	2	5
	Mississippi	1	0	0	0	1
	North Carolina	9	0	0	0	9
	South Carolina	6	0	0	1	7
	Tennessee	6	0	0	0	6
	Total	*49*	*0*	*1*	*12*	*59*
5	Illinois	15	0	0	1	16
	Indiana	14	0	0	4	17
	Michigan	50	0	0	6	51
	Minnesota	11	0	1	14	20
	Ohio	19	0	0	2	21
	Wisconsin	22	0	0	3	24
	Total	*133*	*0*	*1*	*30*	*149*

Exhibit 3.2-12
(continued)

Distribution of Ongoing Remedial Investigation, Feasibility Study, and Remedial Action Projects at the End of Fiscal 1988 by Region and State

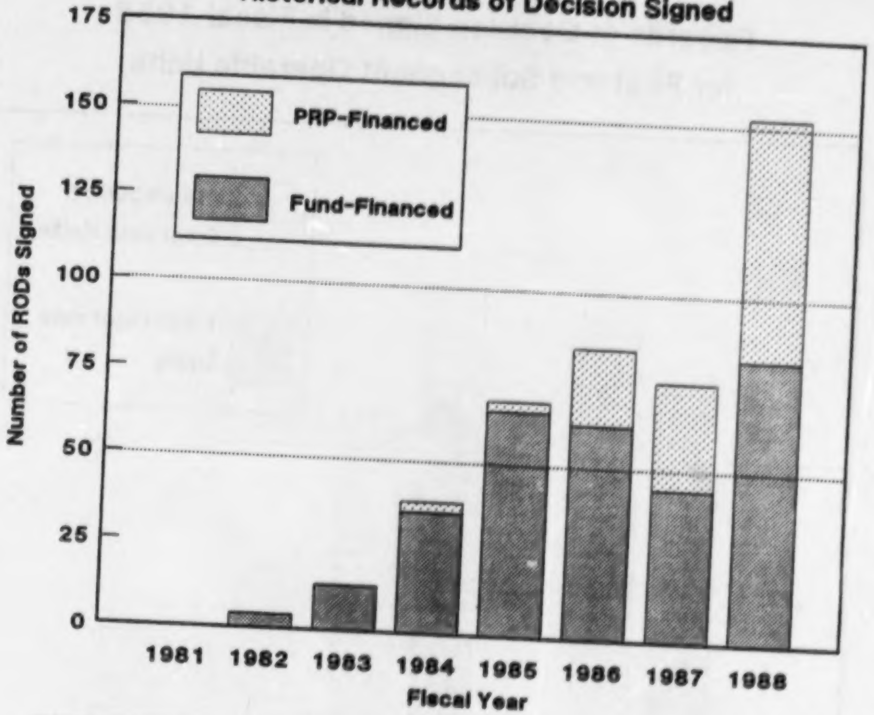
Region	State	RI/FSs	RIs	FSs	RAs	Sites
6	Arkansas	4	0	1	2	6
	Louisiana	0	0	0	3	3
	New Mexico	2	0	0	0	2
	Oklahoma	2	0	0	0	2
	Texas	6	0	0	6	9
	Total	*14*	*0*	*1*	*11*	*22*
7	Iowa	6	0	0	2	6
	Kansas	5	0	0	0	3
	Missouri	8	0	1	6	12
	Nebraska	5	1	0	0	1
	Total	*24*	*1*	*1*	*8*	*22*
8	Colorado	7	3	2	7	10
	Montana	17	2	3	0	7
	Utah	11	0	0	0	8
	Wyoming	1	0	0	0	1
	Total	*36*	*5*	*5*	*7*	*26*
9	Arizona	8	0	0	0	6
	California	64	1	0	8	56
	Total	*72*	*1*	*0*	*8*	*62*
10	Idaho	4	0	0	0	3
	Oregon	3	0	0	1	3
	Washington	10	0	0	2	11
	Total	*17*	*0*	*0*	*3*	*17*
TOTAL ALL REGIONS		*540*	*9*	*14*	*132*	*580*

NOTE: States and territories with no ongoing projects are not included in this exhibit.

SOURCE: CERCLIS.

Exhibit 3.2-13

Historical Records of Decision Signed



									TOTAL
Fund	0	4	13	35	65	62	44	102	325
PRP	0	0	0	3	3	22	31	50	109
TOTAL	0	4	13	38	68	84	75	152	434

NOTE: Accomplishments shown are the totals of first and subsequent actions.

SOURCES: Report to Congress on Progress Toward Implementing Superfund: Fiscal Year 1987, OERR, April 1988;
FY 1988 ROD Summary Report, HSCD/OERR, March 1989.

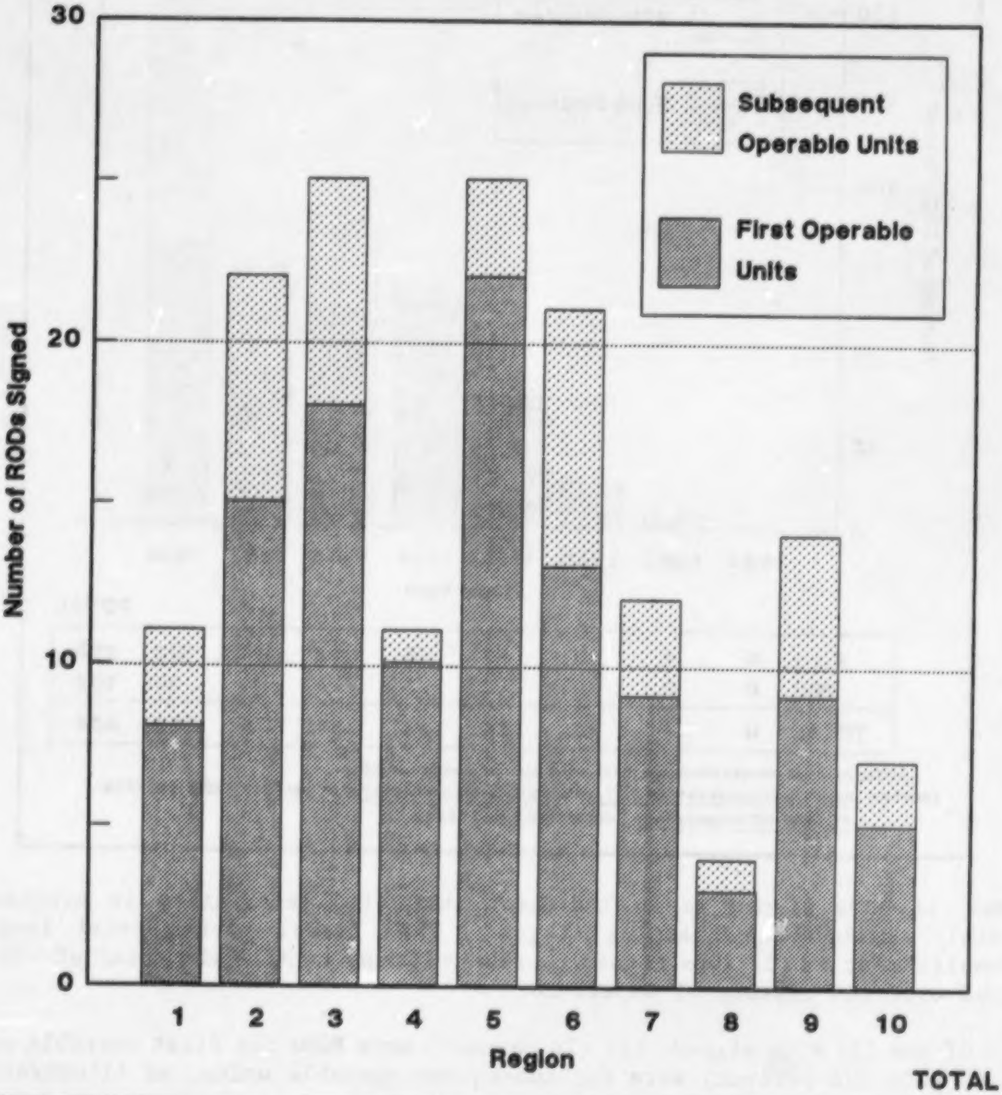
number of RODs signed is an indicator that site remediation is progressing smoothly through the planning stages. This fiscal year's total level of accomplishment of 152 RODs signed represents 35 percent of the total of 434 RODs signed over the history of Superfund.

Of the 152 RODs signed, 112 (74 percent) were RODs for first operable units, and 40 RODs (26 percent) were for subsequent operable units, as illustrated in Exhibit 3.2-14.

The selection of a Superfund remedial course of action is a two-step process. According to the remedy selection process, the lead agency, in conjunction with the support agency, reviews the RI/FS report to identify a preferred alternative. The lead agency should be alert to new information that suggests that changes to the selected remedy may be necessary or appropriate. The preferred alternative is presented to the public in a proposed plan, along

Exhibit 3.2-14

Records of Decision Signed in Fiscal 1988 for First and Subsequent Operable Units



	1	2	3	4	5	6	7	8	9	10	TOTAL
First	8	15	18	11	21	13	9	3	8	6	112
Subsequent	3	7	7	1	4	8	3	1	5	1	40
TOTAL	11	22	25	12	25	21	12	4	13	7	152

SOURCE: CERCLIS.

with supporting observations and tentative analysis, for review and comment. The remedy selection process is illustrated in Exhibit 3.2-15.

The proposed plan is a key decision document, and notice and comment on that plan is required by the provisions of CERCLA section 117. The proposed plan states clearly that the lead agency has identified a preferred alternative but has not made a final decision on which remedy to implement. Changes to the preferred alternative or a change from the preferred alternative to another alternative may be made, if public comments or additional data indicate that these modifications would enable a remedy to better meet overall clean-up goals.

The lead agency reviews the public comments, consults with the support agency, ensures that the use of the preferred alternative remains appropriate, and makes a decision. The selected remedy is based on the evaluation of the nine criteria developed to address the goals and requirements of CERCLA section 121.

The ROD identifies and describes the selected remedy. The ROD is an official, legal document that demonstrates that the remedial action selection process was carried out in accordance with statutory and regulatory requirements of CERCLA section 121. It serves as the centerpiece of the administrative record that a court will review in judging the appropriateness of EPA's decisions about a site. (For a full description of the administrative record, see section 9.5.2 of this Report).

Because the ROD also has an important technical role, it contains an accurate, clear, and complete summary of the problems posed by a site and the alternative ways of addressing them, and the rationale behind the selection of the remedy. The ROD consists of the following three major parts:

- An authorized declaration describing the remedy selected;
- A decision summary that describes the site problems and threats posed, alternatives considered and their relative advantages and disadvantages, and the rationale for the remedy selection; and
- A responsiveness summary describing and responding to public comments submitted on the proposed plan and RI/FS.

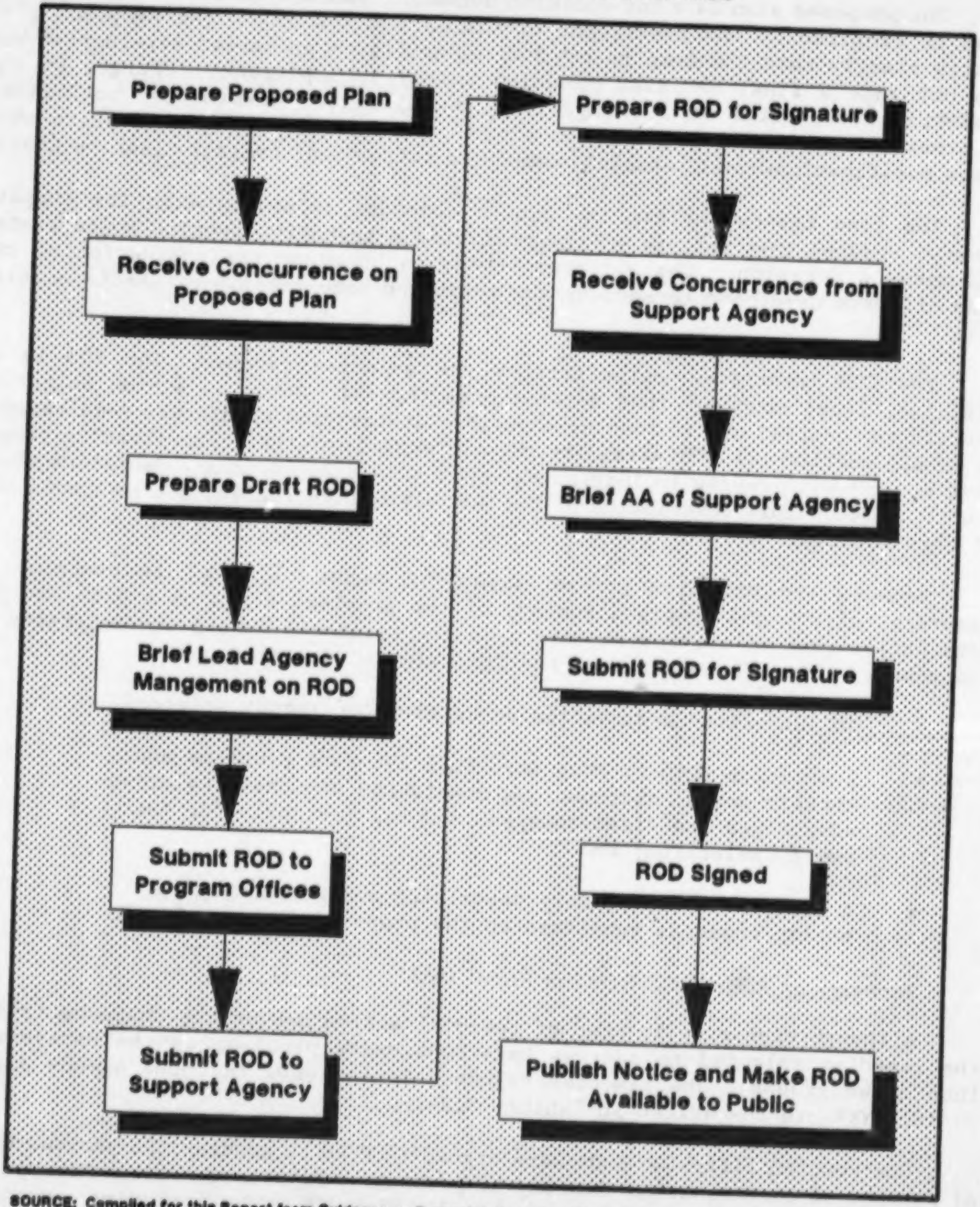
Summary of Remedies Selected in Fiscal 1988

Although each site in need of remedial action has unique characteristics, the remedies selected to address hazardous waste problems can be categorized into a few groups. The remedies selected in the RODs that the Agency signed during FY88 are summarized in Exhibit 3.2-16.

One hundred fifty-two RODs were signed in FY88 to address the various types of sources of contamination that may be present at Superfund sites. Ninety-five of the remedies address source control, with 68 RODs employing treatment technologies. Of the RODs involving source control treatment technologies, 26 (34 percent) involve incineration or thermal destruction, 18 (24 percent) involve solidification or stabilization, 10 (13 percent) involve vacuum

Exhibit 3.2-15

The Remedy Selection Process


Prepare Proposed Plan
Receive Concurrence on Proposed Plan
Prepare Draft ROD
Brief Lead Agency Mangement on ROD
Submit ROD to Program Offices
Submit ROD to Support Agency
Prepare ROD for Signature
Receive Concurrence from Support Agency
Brief AA of Support Agency
Submit ROD for Signature
ROD Signed
Publish Notice and Make ROD Available to Public

SOURCE: Compiled for this Report from Guidance on Preparing Superfund Decision Documents: The Proposed Plan and the Record of Decision, March 1988 Draft.

Exhibit 3.2-16

Summary of Remedy Selection in Records of Decision Signed in Fiscal 1988

Remedy	Total
Source Control Remediation	
Incineration/Thermal Destruction	26
Solidification/Stabilization	18
Vacuum Extraction	10
Volatilization/Soil Aeration	6
Soil Washing/Flushing	6
Biodegradation/Land Application	6
Other Treatment Technologies	4
Subtotal	*76*
Containment Only Remediation	
On-Site Landfill Disposal	24
Off-Site Disposal	3
Subtotal	*27*
Non-Source Control Remediation	
Pump and Treatment	78
Alternate Water Supply	13
Other	5
Leachate Treatment	3
Subtotal	*99*
TOTAL	*202*

NOTES: More than one remedy may be associated witn a site. No further action RODs are not included in this summary. Vacuum extraction total includes the amended ROD that replaced the 12/21/84 ROD for Tyson's Dump, Pennsylvania.

SOURCE: FY 1988 ROD Summary Report, HSCD/OERR, March 1989.

extraction, and the remaining 22 involve other treatment technologies. Forty-nine RODs addressed both source control and ground-water remediation. Of the 152 RODs signed in FY88, 95 were final source control RODs, 39 were ground-water action only RODs, 4 were source control interim action RODs, and 14 were no further action RODs.

An RI/FS sometimes results in a ROD recommendation that no further action is required to protect human health and the environment for one or more operable units, even though the Hazard Ranking System (HRS) score for the site indicated that a site response was warranted. There may be several possible reasons for such an outcome. The HRS, which is a general screening tool, uses a limited data set, but an RI/FS collects and generates much more data, since RI/FSs more completely characterize the threat. Alternatively, a previous removal action at the site, or the completion of a previous operable unit, or natural attenuation may reduce the threat, so that further response action is unwarranted.

CERCLA section 121 requires that permanent solutions and alternative treatment technologies be used at Superfund sites to the maximum extent practicable. In addition, SARA added a statutory preference for remedies that use treatment as a principal element to reduce the toxicity, mobility, or volume of contaminants. Exhibit 3.3-17 illustrates remedies selected in historical RODs. The use of treatment-based source control remedies has been increasing steadily over the history of the Superfund program, and the use of containment-based source control remedies has been declining.

Section 301(h)(1)(A) requires that summaries of each FS conducted during the fiscal year be submitted to Congress annually. Since the RODs summarize the most important portions of the FSs, summaries for this report, as shown in Appendix B, are based on RODs that the Agency signed during FY88 and include information on the major contaminants of concern at a site, the remedial alternatives considered, and the selected remedy.

Remedy Selection Guidance Documents

In March 1988, EPA issued a *Draft Guidance on Preparing Superfund Decision Documents: The Proposed Plan and Record of Decision* to assist Regional, state, and Headquarters personnel in documenting remedy selection decisions. The revised ROD guidance reflects the Agency's six years of program experience since the original guidance was issued. It also reflects the enhanced partnership between EPA and states in the preparation of decision documents, as specified in CERCLA section 121(f)(1).

The guidance includes a discussion of the following elements of a remedy selection:

- Developing the proposed plan;
- Writing the proposed plan;
- Newspaper notification and public comment period provisions;

Exhibit 3.2-17

Remedies Selected in Historical Records of Decision

Fiscal Year	Treatment-Based Source Control Remedies	Containment-Based Source Control Remedies
1988	74%	26%
1987	57%	43%
1986	45%	55%
1985	23%	77%
1982-1984	16%	84%

SOURCES: Report to Congress on Progress Toward Implementing Superfund: Fiscal Year 1987, OERR, April 1989; FY 1988 ROD Summary Report, HSCD/OERR, March 1989.

- Making significant changes to the proposed plan;
- Developing the ROD;
- Writing the ROD; and
- Making significant changes after the ROD is signed.

The draft guidance document was circulated for Regional comments prior to developing the final guidance. The Agency issued interim final guidance in June 1989. The Agency added to its latest guidance a chapter outlining special documentation procedures for no action, limited action, and contingency remedy decisions.

The ROD interim guidance and the forthcoming RI/FS final guidance will be used as interrelated, interdependent documents. EPA is also currently preparing guidance on the role of federal facilities in the remedy selection process.

Applicable or Relevant and Appropriate Requirements

EPA issued the draft *CERCLA Compliance with Other Laws Manual Part I*, for use in August 1988. Part II of the Manual is currently being developed, including a chapter addressing "CERCLA Compliance with State Requirements." The two-part Manual provides guidance to Remedial Project Managers (RPMs) and On-Scene Coordinators (OSCs) on how to implement remedies that comply with federal and State environmental requirements that are determined to be ARARs. The State Compliance chapter contains quick-reference charts for identifying state requirements that are potential ARARs and for determining whether they are ARARs for a site.

Part I, completed in June 1988, addresses general procedures for determining ARARs and CERCLA compliance with ARARs in the Resource Conservation and Recovery Act (RCRA), the Clean Water Act (CWA), the Safe Drinking Water Act (SDWA), and ground-water protection policies. Part II addresses compliance with ARARs in the Clean Air Act (CAA), the Toxic Substances Control Act (TSCA), the Surface Mining Control and Reclamation Act (SMCRA), and several other resource protection statutes.

3.2.5 Remedial Design

The Agency completed 76 RDs during the fiscal year, among them 61 (80 percent) first completions and 15 (20 percent) subsequent completions. Of the RDs completed during the fiscal year, 55 (72 percent) were Fund-financed and 21 (28 percent) were PRP-financed. There were more remedial design (RD) starts during FY88 than in any other fiscal year. The historical accomplishments, including this fiscal year's record high, are illustrated in Exhibit 3.2-18. Of the 99 RDs that the Agency started during FY88, 69 (70 percent) were Fund-financed, and PRPs financed the remaining 30 (30 percent). Sixty-five (66 percent) were first starts, and 34 (34 percent) were subsequent starts. The FY88 level of accomplishment represents 32 percent of the total of 309 RD starts over the history of Superfund.

3.2.5.1 The Remedial Design Process

The purpose of the RD phase of the cleanup process is to design and draft engineering plans and specifications for the remedy selected. The RD process is illustrated in Exhibit 3.2-19. Remedial design projects may appear to be similar to any other major construction project, but the likely presence of dangerous materials demands special planning.

The implementation of RD and subsequent RA activities flows from the remedy selected in the ROD and cannot be inconsistent with, or substantively different from, the remedy and its intent. In addition, the RD and the RA must meet all necessary federal and state ARARs identified for the site.

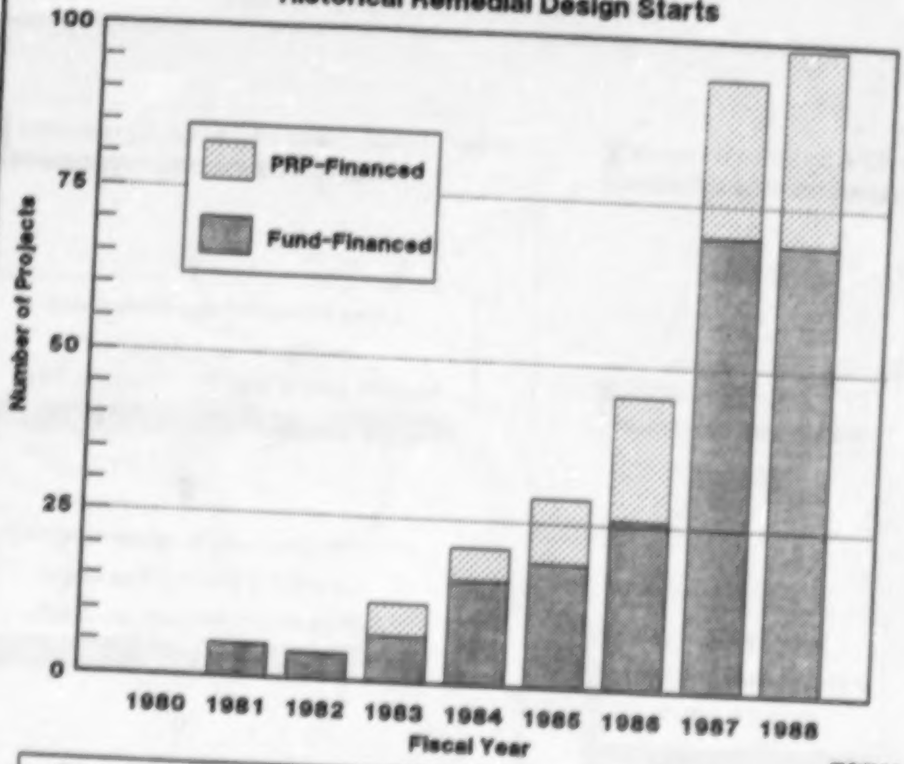
3.3 Response Action Work Force

EPA has placed an increasing emphasis on improving the efficiency and effectiveness of the Superfund work force.

An October 1987 General Accounting Office (GAO) report made 16 recommendations to Congress on how to improve work force retention, management, and training. In response to the report, the Agency focused on the need for experienced, knowledgeable On-Scene Coordinators (OSCs) and Remedial Project Managers (RPMs). OSCs and RPMs represent about one-fourth of the total Superfund work force. Although about half of Superfund employees have worked with the program for two to five years, most OSCs and RPMs do not have extensive program experience.

Exhibit 3.2-18

Historical Remedial Design Starts



	1980	1981	1982	1983	1984	1985	1986	1987	1988	TOTAL
Fund	0	5	4	7	16	19	26	70	69	216
PRP	0	0	0	5	5	10	19	24	30	93
TOTAL	0	5	4	12	21	29	45	94	99	309

NOTE: Accomplishments shown are the sum of first and subsequent actions.
SOURCES: CERCLIS; Report to Congress on Progress Toward Implementing Superfund: Fiscal 1987, OERR, April 1988.

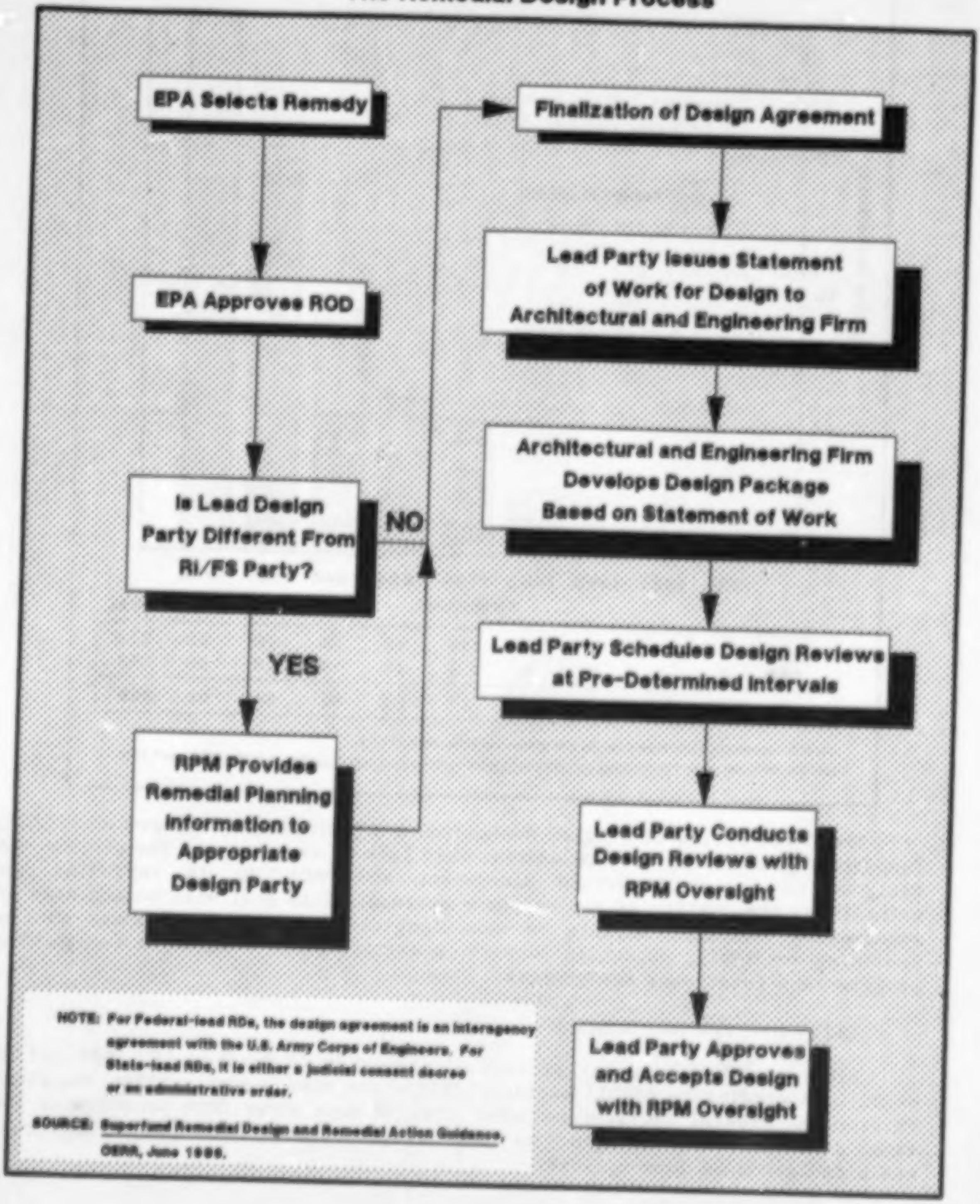
The OSWER Office of Program Management and Technology developed an *OSC/RPM Support Program* during FY88 to address this lack of experience. The program was designed to assist Superfund management and OSCs/RPMs in improving and maintaining the quality of the response actions. This goal will be achieved by encouraging Superfund workers to make long-term service commitments and by providing continuing education support, a certification program, a recognition program, and rotational assignments.

3.3.1 Worker Protection Standards

EPA proposed its worker protection standards on October 17, 1988 (53 *FR* 40692). According to CERCLA section 121(f), the Agency must publish its final rule in the *Federal Register* no later than 90 days after OSHA promulgates its final standards, and the Agency met this statutory deadline. EPA's final rule was promulgated on June 6, 1989.

Exhibit 3.2-19

The Remedial Design Process


EPA Selects Remedy
EPA Approves ROD
Is Lead Design Party Different From RI/FS Party?
NO
YES
RPM Provides Remedial Planning Information to Appropriate Design Party
Finalization of Design Agreement
Lead Party Issues Statement of Work for Design to Architectural and Engineering Firm
Architectural and Engineering Firm Develops Design Package Based on Statement of Work
Lead Party Schedules Design Reviews at Pre-Determined Intervals
Lead Party Conducts Design Reviews with RPM Oversight
Lead Party Approves and Accepts Design with RPM Oversight

NOTE: For Federal-lead RDs, the design agreement is an interagency agreement with the U.S. Army Corps of Engineers. For State-lead RDs, it is either a judicial consent decree or an administrative order.

SOURCE: Superfund Remedial Design and Remedial Action Guidance, OERR, June 1986.

The Occupational Safety and Health Administration (OSHA) and EPA have agreed that OSHA has the lead role in providing for the safety and health of workers at hazardous waste sites. OSHA proposed its final worker protection standard on August 10, 1987 (52 *FR* 29620) and published its final standard on March 6, 1989. The Secretary of Labor is required to issue proposed standards for the health and safety protection of employees engaged in hazardous waste operations. These provisions are designed to address factors such as worker training, medical surveillance, protective equipment, exposure limits, and informational programs.

The EPA regulations are identical to the OSHA regulations for federal employees, private employees, and state and local employees in states that have OSHA-approved state plans, but EPA's regulations apply only to those state and local employees in states that do not have approved state plans under section 18(c) of the Occupational Safety and Health Act of 1970.

4.0 SITE DISCOVERY AND ASSESSMENT

During the site-discovery and assessment phase of Superfund response action, EPA is first made aware of hazardous waste sites. The program then conducts preliminary assessments (PAs) and, if appropriate, site inspections (SIs) to assess the extent of the threat posed by contamination at a site and to decide whether a removal action is necessary at the site, and/or to determine whether the site merits listing on the NPL or no further action. At the end of the fiscal year, there were 30,013 sites in the CERCLA Information System (CERCLIS) inventory. Exhibit 4.0-1 illustrates historical pre-remedial program accomplishments and shows the cumulative number of sites in CERCLIS from 1980 through 1988. The Agency exceeded its goals for assessing hazardous waste sites in FY88. The PA target of 2,432 was exceeded by 21 percent for a total of 2,884 completions. The FY88 SI target of 1,117 was exceeded by 11 percent for a total of 1,237 completions. Exhibit 4.0-1 also charts the pre-remedial program accomplishments from FY80 through FY88.

In addition, the Agency published several guidance documents and proposed rules relevant to release notification and site-discovery and assessment including:

- *The Pre-Remedial Strategy for Implementing SARA*;
- *Preliminary Assessment Guidance for Fiscal Year 1988*;
- The federally permitted release proposed rule; and
- The continuous release proposed rule.

EPA also made substantial progress during the fiscal year toward completing:

- The proposed revisions to the Hazard Ranking System (HRS);
- A proposed rule designating extremely hazardous substances (EHSs) as CERCLA hazardous substances;
- A proposed rule adjusting the reportable quantities (RQs) of the designated EHSs;
- A final rule adjusting the RQs for 273 CERCLA hazardous substances; and
- A final rule adjusting the RQs for radionuclides.

4.1 The Site Discovery and Assessment Process

EPA is made aware of possible hazardous waste sites in a variety of ways. For example, individuals might report concerns about a particular site in their neighborhood, local law enforcement officials might inform the Agency of incidents of midnight dumping, or a facility manager might make a formal report to EPA. Also, CERCLA section 105(d) specifies that any individual may petition EPA to perform a PA of a site. In addition, CERCLA contains reporting provisions that require persons in charge of a vessel or facility to immediately

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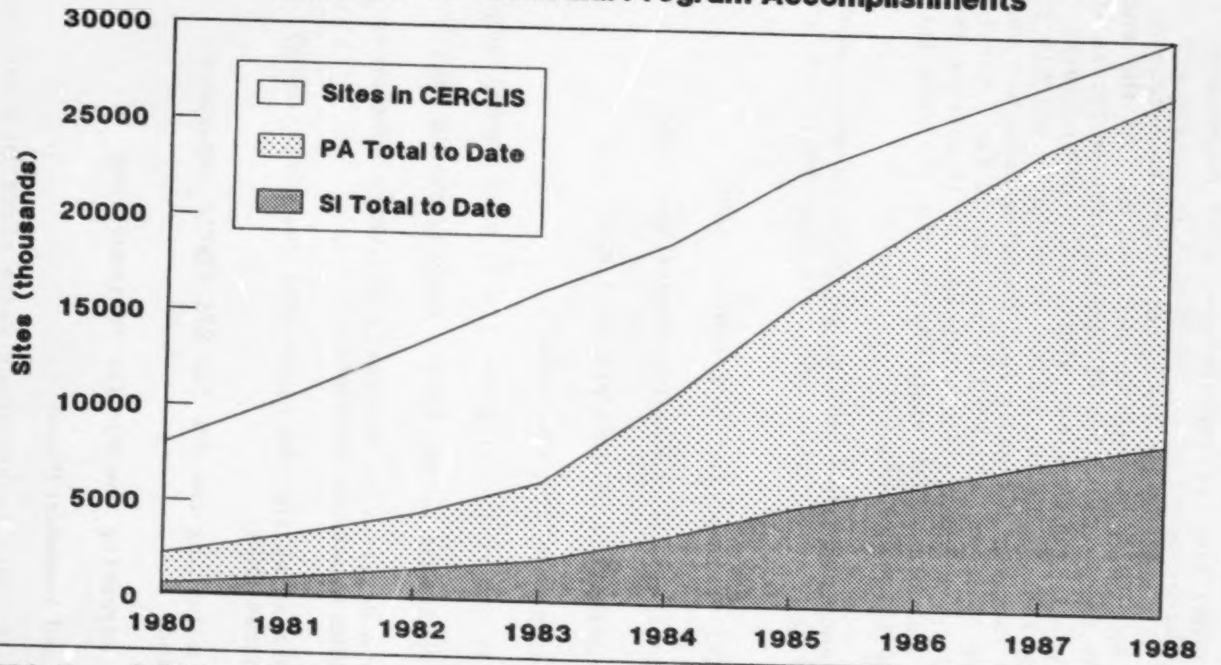
Exhibit 4.0-1

Historical Pre-Remedial Program Accomplishments



	1980	1981	1982	1983	1984	1985	1986	1987	1988
Sites in CERCLIS	8,000	10,500	13,386	16,309	18,884	22,621	25,194	27,571	30,013
PA Completed	2,204	1,072	1,209	1,809	4,447	5,181	4,262	4,001	2,884
Total to Date	2,204	3,276	4,485	6,294	10,741	15,922	20,184	24,185	27,069
SI Completed	613	428	566	642	1,308	1,618	1,267	1,343	1,237
Total to Date	613	1041	1,607	2,249	3,557	5,175	6,442	7,785	9,022

NOTE: This graph represents the number of PAs and SIs completed during each fiscal year, and depicts the increase in the number of sites in the CERCLIS inventory in each fiscal year.

SOURCE: CERCLIS; Report to Congress on Progress Toward Implementing Superfund, Fiscal 1987, OERR, April 1989.

notify the National Response Center (NRC) of releases of hazardous substances. When a site has been identified as a place where hazardous waste may exist, it is entered into EPA's CERCLA Information System (CERCLIS).

Once EPA is made aware of a possible hazardous waste site, the pre-remedial phase of the Superfund program begins. A preliminary assessment of existing site information provides the basis for determining whether there is any potential need for a removal action. The PA is also used to set priorities for pre-remedial site inspections; to gather appropriate existing data to assist in developing a hazard ranking score; and to eliminate from further remedial consideration those releases that do not threaten public health or the environment. In many cases, those sites that are eliminated from remedial consideration are deferred to the states.

At sites warranting additional study, SIs are completed to further evaluate potential hazard. On the basis of the SI, a hazard ranking system (HRS) score is assigned (where appropriate) and a decision is made as to whether the site should be placed on the NPL. Exhibit 4.1-1 illustrates the stages a site goes through during the site discovery and assessment phase of Superfund response action.

4.2 Notification

Timely notification of hazardous substance releases is critical to the success of the response program. As noted above, CERCLA contains specific requirements for reporting releases of hazardous substances. Sections 103(a) and (b) require that persons in charge of a vessel or a facility from which a hazardous substance is released in amounts equal to or greater than its reportable quantity (RQ) immediately notify the National Response Center (NRC) of such a release.

4.2.1 National Response Center

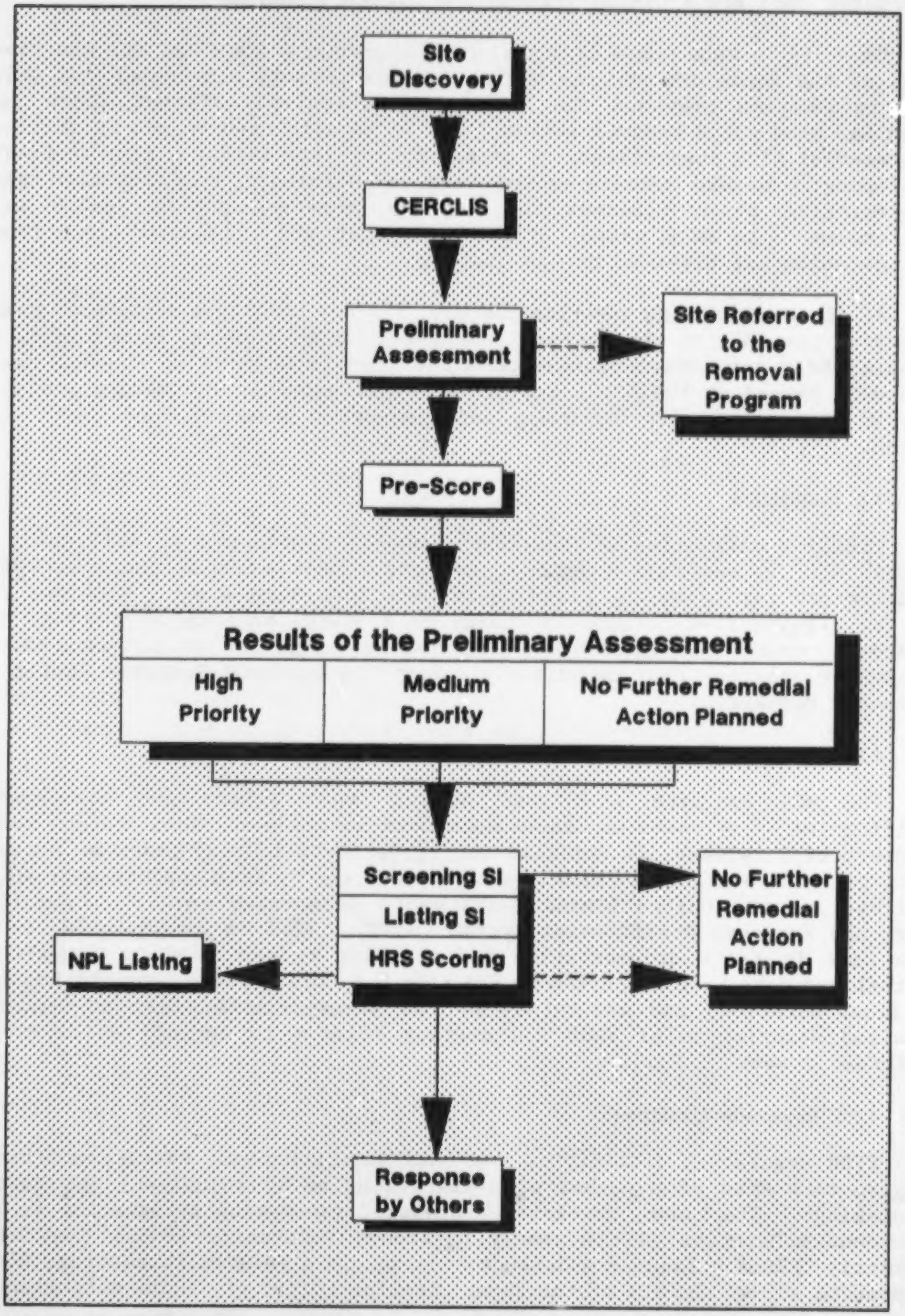
The NRC operates a 24-hour hotline that allows for the immediate notification of releases of CERCLA hazardous substances. When the NRC receives a report of a release, it notifies the appropriate federal response personnel. Every release notification received by the NRC and by EPA Headquarters, Regional offices, and the United States Coast Guard is entered into the computerized Emergency Response Notification System (ERNS). ERNS is an important response data base in EPA's documentation and tracking system. It is a nationwide, centralized data base supported by EPA, the U.S. Coast Guard, and the Department of Transportation, and maintained by the Transportation Systems Center. A detailed description of ERNS and current efforts to upgrade the system are included in section 9.4.

4.2.2 Reportable Quantities

FY88 regulatory activity in the hazardous substance release notification program consisted of a number of designation and RQ adjustment and reporting rulemakings. The Agency developed a proposed rulemaking designating as CERCLA hazardous substances all extremely hazardous substances (EHSs) that are not currently CERCLA hazardous substances. Also, in a related rulemaking, EPA will propose to adjust the RQs of the EHSs. Section 102(b) of CERCLA establishes one

Exhibit 4.1-1

The Site Discovery and Assessment Process


Site Discovery
CERCLIS
Preliminary Assessment
Site Referred to the Removal Program
Pre-Score
Results of the Preliminary Assessment
High Priority
Medium Priority
No Further Remedial Action Planned
Screening SI
Listing SI
HRS Scoring
NPL Listing
No Further Remedial Action Planned
Response by Others

SOURCE: Developed for this Report.

pound as the statutory reportable quantity (RQ) for all releases of hazardous substances except those for which RQs were established pursuant to section 311(b)(4) of the Clean Water Act. Section 102(a) of CERCLA authorizes the Administrator of EPA to adjust RQs for hazardous substances and to designate as hazardous substances those which, when released into the environment, may present substantial danger to the public health or welfare or the environment. Currently, there are 725 CERCLA hazardous substances. A more detailed description of reporting requirement rulemakings is included in section 9.5.3.

The Agency also published proposed rules during the fiscal year that explain the reduced reporting requirements for continuous releases and interpret the definition of federally permitted releases in CERCLA section 101(10). CERCLA section 103(f)(2) assumes that if a release occurs regularly and in relatively stable amounts, federal officials do not need to be notified each time the release occurs to have the necessary information to decide whether a response is desirable. The continuous release rule, proposed on April 19, 1988, establishes criteria for determining what constitutes a continuous release and explains the reduced reporting requirements for releases that satisfy the criteria.

The federally permitted release interpretive rule, proposed on July 19, 1988, clarifies the federally permitted release definition in CERCLA 101(10). Releases of CERCLA hazardous substances that are federally permitted are exempt from CERCLA section 103(a) reporting requirements. CERCLA section 107(j) also exempts a federally permitted release from liability for response costs and damages incurred due to the release.

4.3 The Inventory of Sites (CERCLIS)

As noted above, when the Agency identifies a site as a place where hazardous waste may exist, it enters information concerning the site into CERCLIS. CERCLIS, which is maintained by the Office of Emergency and Remedial Response, is a national inventory of all sites potentially appropriate for listing on the National Priorities List (NPL). As of September 1988, CERCLIS contained data on 30,013 sites. The Agency completed PAs on 2,884 of these sites during the fiscal year. At the end of this fiscal year, only 2,944 sites in the inventory required PAs. In addition to a site inventory, CERCLIS also provides key data elements for monitoring the financial and technical progress of remedial, removal, and enforcement actions.

During the fiscal year, the Agency began a study to categorize the sites in CERCLIS that have been investigated under the Superfund program. With information gathered from the study, EPA is developing a data base that will aid the Agency in drawing conclusions concerning the type of sites nominated for cleanup. The data base also will allow the Agency to more easily identify policy issues of concern to the pre-remedial program. Each Region's Field Investigation Team (FIT) participated in the study. In October 1988, EPA began a pilot program in Region 10 to test the capabilities of the data base. CERCLIS is described in detail in section 9.4.

4.4 Preliminary Assessments

A preliminary assessment is the first step EPA takes in determining the actual threat a site poses to the public and/or the environment. During a PA, the Agency, by collecting existing information, evaluates the magnitude of the potential hazard at a site and determines the source and nature of the release. EPA collects information from its own files, state and local records, and U.S. Geological Survey maps. Also, telephone calls often are made to persons in the locality who are familiar with the site. Site visits to search files or interview site managers are made when appropriate. On-site surveys of the actual area of contamination, however, are performed at the discretion of the Regional Office. On the basis of the PA, EPA decides whether the site merits further investigation.

4.4.1 Statutory Goals Under CERCLA Section 116

Section 116 of CERCLA specifies that PAs are to be completed by January 1, 1988, for all sites listed in CERCLIS as of October 1986. In January of 1988, the Agency announced that it had met the statutory target for completing PAs. Achieving this goal required the completion of PAs for almost 1000 sites in the first quarter of the fiscal year. Over the entire fiscal year, EPA completed 2,884 PAs. There are now 27,069 sites listed in CERCLIS that have completed PAs. Exhibit 4.4-1 illustrates the cumulative percentage of PAs completed through FY88. Elimination of the PA backlog allowed the Agency to establish a new policy requiring that all sites entered into CERCLIS receive a completed PA within one year. This action was taken to prevent accumulating a new backlog.

The Pre-Remedial Strategy for Implementing SARA published by EPA on February 2, 1988, describes the strategy that the Agency used to achieve the initial statutory requirements of SARA and reflects Agency goals for satisfying the subsequent SARA requirements. The strategy emphasizes the importance of acquiring enough information early in the pre-remedial process to enable EPA to expeditiously determine which sites will require site inspections. As a result the PA has been expanded in scope and involves more site-specific research. The Agency also is now considering HRS factors at both the PA and SI stages in order to help develop a projected HRS score. Sites that do not require a removal action and have no probability of being listed on the NPL are designated "No Further Remedial Action Planned (NFRAP)" and will receive no further Superfund evaluation. These sites, however, often are deferred to states for further assessment. Approximately 11,000 sites have been so designated.

4.4.2 Reassessment of Low-Priority Sites

During the fiscal year, the Agency also conducted a full-scale reassessment of sites that previously had been assigned low priority for site inspections. Approximately 5,000 existing PAs were re-evaluated in order to more accurately assess the SI workload. Through the re-evaluation, EPA determined that no further remedial action was required at approximately 3,000 low priority sites.

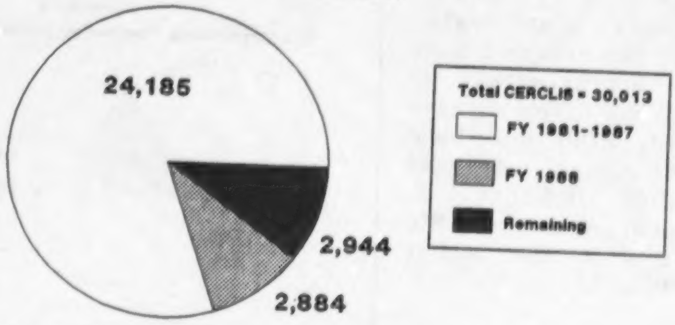
4.4.3 Preliminary Assessment Guidance

EPA issued interim guidance on PAs in January 1988. The interim guidance applies to all PAs that will be conducted at sites included in CERCLIS,

Exhibit 4.4-1

CERCLIS Sites with Preliminary Assessments Completed Through Fiscal 1988

(cumulative)



SOURCE: OSWER Annual Report, Fiscal 1988, November 1988.

regardless of the date of entry into the system. The guidance reflects the pre-remedial program goals described in the *Pre-Remedial Strategy for Implementing SARA*. In the guidance, the Agency modified the PA to identify more effectively those sites that require site inspections (SIs). The level of effort for an average PA is increased from 50 hours to approximately 75 hours. Also, the guidance incorporates activities such as on- or off-site reconnaissance, the application of technical evaluation criteria and professional judgment, site visits to search files or interviews of site managers, and other technical factors for prioritizing sites for an SI. The revisions to the HRS had not been proposed as of January 1988, thus, the guidance is interim. The Agency, however, made substantial progress during the fiscal year in revising the interim PA guidance to incorporate the proposed changes in the HRS. EPA conducted studies in the Regions to determine the best method of performing PAs under the revised HRS. The guidance will be finalized once the changes in the HRS are finalized and effective.

4.4.4 Prescore

To bring consistency to the application of scoring factors to site conditions and to facilitate consideration of the HRS during the PA as well as the SI, EPA is developing a computer program called Prescore (formerly Site Screening Analysis). Prescore uses site-specific data to project HRS scores for a site. Developing probable HRS scores is a key step when making decisions as to whether remedial action will be appropriate for a given site on which a site evaluation is being performed. Prescore not only provides rationale and documentation to back up decisions regarding additional activities at sites, but also allows variables to be adjusted thus enabling the scorer to see how different factors will affect the projected HRS score. Prescore software has been distributed to the Regions and is in the process of being field tested.

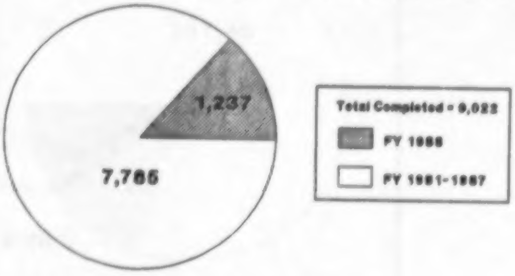
4.5 Site Inspections

If the PA indicates that a suspected release of hazardous substances may threaten human health or the environment, EPA orders a site inspection (SI). Approximately 30 percent or 9,022 of the sites entered in CERCLIS through FY88 now have completed SIs. The Agency completed 1,237 SIs during FY88. Exhibit 4.5-1 compares the total number of SIs conducted in FY88 with the number conducted in previous fiscal years.

The Agency exceeded its FY88 target for completing SIs by 120. All of the Regions contributed to this success by equaling or exceeding their respective goals.

Exhibit 4.5-1

Site Inspections Completed Through Fiscal 1988



SOURCE: OSWER Annual Report, Fiscal 1988, November 1988.

4.5.1 Screening Site Inspections

In order to expedite the SI process the Agency divided it into two phases. EPA distinguishes between screening site inspections (SSIs) and listing site inspections (LSIs). SSIs consist of a visual inspection of the site and include collection and chemical analysis of a limited number of samples of environmental media. The purposes of the screening SI are to identify those releases that pose no current or potential threat to public health and the environment; to determine whether there exists any immediate threat to persons living or working near the release that might necessitate an immediate removal action; and to collect data to help determine whether the site should be included on the National Priorities List.

EPA made substantial progress in the fiscal year toward completing guidance on the SSI data collection requirements and procedures under the proposed revised HRS. The guidance will be finalized once the changes in the HRS are effective.

4.5.2 Listing Site Inspections

The Agency makes a decision at the completion of the screening SI as to whether a listing SI will be conducted. To determine which sites should be placed on the NPL, EPA and states use a special scoring system called the Hazard Ranking System (HRS). Revisions to the HRS, required by CERCLA section 105(c)(1) as amended, are currently being completed. Section 9.5.1 provides complete details on the HRS revisions. The HRS score takes into account the types and quantities of waste at a site, the extent of contamination that has already occurred (especially of groundwater), and the number of people living or working near the site who could be exposed to hazardous chemicals escaping from it. The score is achieved by assigning numerical values to threats posed to the public and the environment by the migration of a hazardous substance through ground water, surface water, and air. Any site that is assigned a score of 28.5 or higher is eligible for placement on the NPL. The value of 28.5 was chosen to yield an original NPL of at least 400 sites, not because it represents a threshold in the significance of the risk presented by the site. During the listing site inspection phase, the Agency actually scores the site using the hazard ranking system.

5.0 THE NATIONAL PRIORITIES LIST OF SITES

The National Priorities List (NPL) identifies abandoned or uncontrolled hazardous waste sites as target sites for long-term remedial action. At the end of fiscal year 1988, 797 sites were listed, and 378 sites were proposed for listing on the NPL, for a total of 1175 NPL sites. The list includes 32 final and 30 proposed federal facility sites. Exhibit 5.0-1 lists federal and non-federal NPL and proposed sites by state and EPA Region as of September 1988. Exhibit 5.0-2 is a map showing total NPL sites by state as of September 1988.

During the fiscal year, the Agency proposed 229 sites and reproposed 13 sites for listing. The balance of sites was proposed in previous fiscal years. In addition, EPA deleted five sites from the list and announced its intent to delete nine additional sites. The Agency also announced plans to drop 30 of the sites proposed for listing. In addition, EPA:

- Took comment on the idea of expanding the NPL deferred listing policy;
- Added to the criteria for listing Resource Conservation and Recovery Act (RCRA) sites;
- Modified its policy for determining when a RCRA facility owner/operator is unwilling to pay for corrective action; and
- Sought comment on a modified policy for determining when a RCRA facility owner/operator is unable to pay for corrective action.

5.1 Sites Added to the National Priorities List

On June 24, 1988, EPA published its seventh update of the NPL in the *Federal Register*. This notice proposed 229 new sites and the expansion of one final site, and it reproposed four previously proposed sites. In addition, the Agency stated its intention to list 13 RCRA sites that were previously proposed for the NPL and to drop 30 RCRA sites from the proposed NPL. The notice including this update also announced an expansion of the criteria for listing RCRA sites on the NPL. EPA also made substantial progress towards completing updates number eight and number nine during the fiscal year.

Prior to promulgation of the revised HRS, the Agency expects to have finalized updates eight, nine, and the remaining proposed sites from all previous updates.

5.1.1 Methods for Listing Sites

Generally, the Agency updates the NPL at least once each year. Sites are added to the NPL on the basis of the hazard ranking score (HRS) assigned to them after a site inspection is completed. The factors the Agency considers when assigning an HRS score are the quantities and toxicity of the wastes involved, the number of people potentially exposed, the likely pathways of exposure, and the importance and vulnerability of the underlying supply of ground water. Any site that scores 28.5 or higher is eligible for placement on the NPL. The

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Exhibit 5.0-1

National Priorities List Sites by State or Territory As of September 1988

Region	State	Final Non-Federal	Final Federal	Proposed Non-Federal	Proposed Federal	Total
1	Connecticut	7	0	7	0	14
	Maine	5	1	2	0	8
	Massachusetts	20	1	1	0	22
	New Hampshire	13	0	2	0	15
	Rhode Island	8	0	1	0	9
	Vermont	2	0	6	0	8
	Total	*55*	*2*	*19*	*0*	*76*
2	New Jersey	94	2	13	1	110
	New York	62	1	13	0	76
	Puerto Rico	8	0	0	1	9
	Virgin Islands	0	0	0	0	0
	Total	*164*	*3*	*26*	*2*	*195*
3	Delaware	12	0	8	1	21
	District of Columbia	0	0	0	0	0
	Maryland	6	0	2	2	10
	Pennsylvania	60	1	34	2	97
	Virginia	10	1	11	0	22
	West Virginia	5	0	1	0	6
	Total	*93*	*2*	*56*	*5*	*156*
4	Alabama	8	1	2	1	12
	Florida	32	0	17	0	49
	Georgia	3	1	9	0	13
	Kentucky	10	0	7	0	17
	Mississippi	2	0	1	0	3
	North Carolina	9	0	11	1	21
	South Carolina	12	0	9	0	21
	Tennessee	8	1	4	0	13
	Total	*84*	*3*	*60*	*2*	*149*
5	Illinois	15	2	20	2	39
	Indiana	24	0	13	0	37
	Michigan	58	0	23	0	81
	Minnesota	39	1	0	0	40
	Ohio	28	0	3	1	32
	Wisconsin	32	0	7	0	39
	Total	*196*	*3*	*66*	*3*	*268*

SOURCES: National Priorities List, Supplementary Lists and Supporting Materials, OERR, June 1988; 53 FR 33811, September 1, 1988.

Exhibit 5.0-1
(continued)

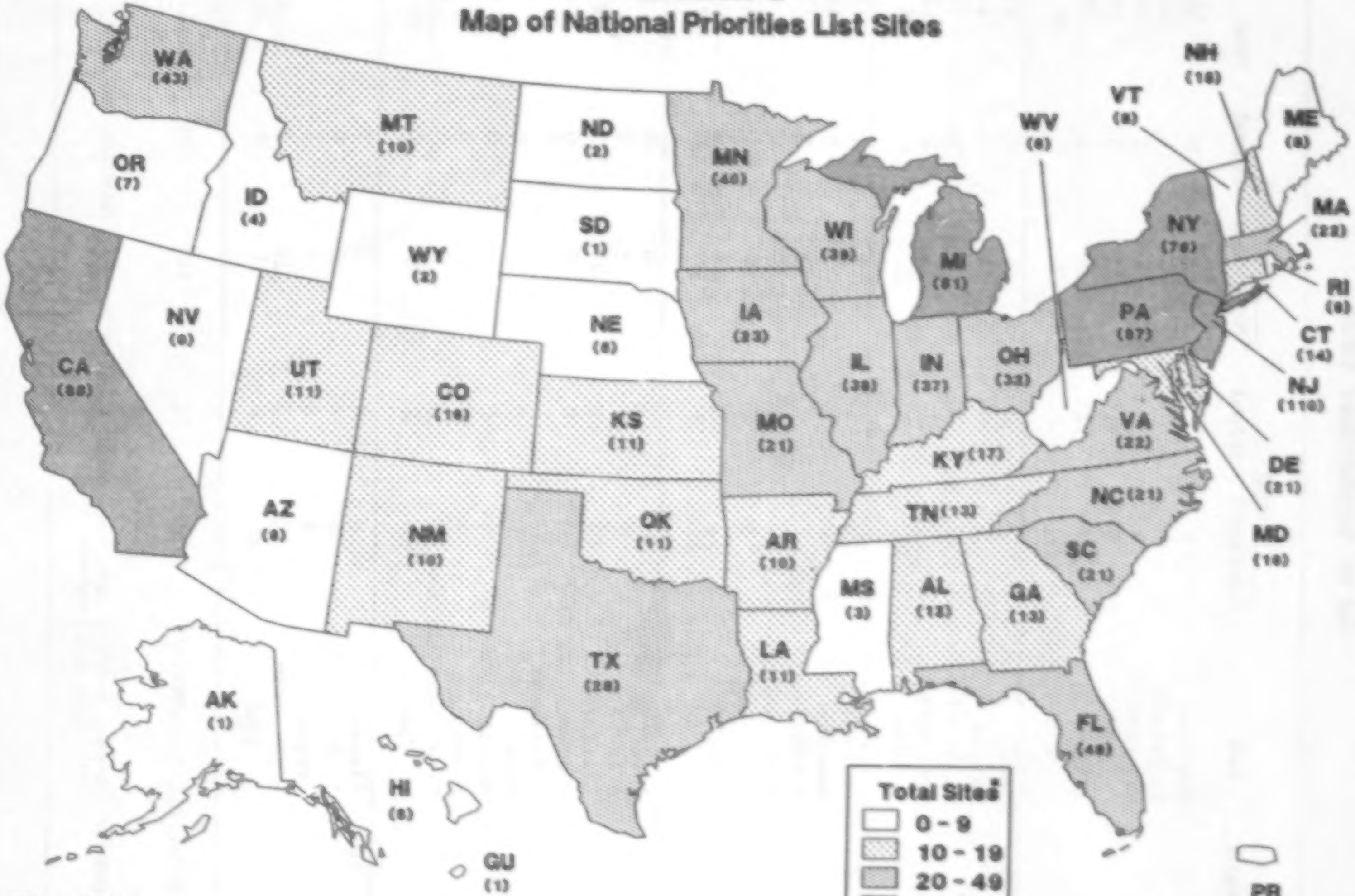
National Priorities List Sites by State or Territory As of September 1988

Region	State	Final Non-Federal	Final Federal	Proposed Non-Federal	Proposed Federal	Total
6	Arkansas	9	0	1	0	10
	Louisiana	6	0	4	1	11
	New Mexico	4	0	4	2	10
	Oklahoma	5	1	5	0	11
	Texas	20	1	6	1	28
	Total	*44*	*2*	*20*	*4*	*70*
7	Iowa	7	0	16	0	23
	Kansas	7	0	4	0	11
	Missouri	12	2	7	0	21
	Nebraska	2	1	2	0	5
	Total	*28*	*3*	*29*	*0*	*60*
8	Colorado	12	1	2	1	16
	Montana	8	0	2	0	10
	North Dakota	1	0	1	0	2
	South Dakota	1	0	0	0	1
	Utah	3	2	5	1	11
	Wyoming	1	0	1	0	2
	Total	*26*	*3*	*11*	*2*	*42*
9	American Samoa	0	0	0	0	0
	Arizona	5	0	3	1	9
	California	40	8	37	3	88
	Commonwealth of Marianas	0	0	0	0	0
	Guam	1	0	0	0	1
	Hawaii	0	0	6	0	6
	Nevada	0	0	0	0	0
	Trust Territories	0	0	0	0	0
	Total	*46*	*8*	*46*	*4*	*104*
10	Alaska	0	0	1	0	1
	Idaho	4	0	0	0	4
	Oregon	4	1	2	0	7
	Washington	20	3	12	8	43
	Total	*28*	*4*	*15*	*8*	*55*
TOTAL ALL REGIONS		765	32	348	30	1,175

SOURCES: National Priorities List, Supplementary Lists and Supporting Materials, OERR, June 1988; 53 FR 33811, September 1, 1988.

Exhibit 5.0-2

Map of National Priorities List Sites


WA
(43)
OR
(7)
CA
(88)
ID
(4)
NV
(0)
MT
(10)
WY
(2)
UT
(11)
AZ
(8)
CO
(16)
NM
(10)
ND
(2)
SD
(1)
NE
(6)
KS
(11)
OK
(11)
TX
(28)
MN
(40)
IA
(23)
MO
(21)
AR
(10)
LA
(11)
WI
(39)
IL
(38)
MI
(81)
IN
(37)
OH
(32)
KY (17)
TN (13)
MS
(3)
AL
(12)
GA
(13)
FL
(48)
SC
(21)
NC (21)
VA
(22)
WV
(6)
PA
(97)
NY
(76)
VT
(8)
NH
(16)
ME
(8)
MA
(22)
RI
(9)
CT
(14)
NJ
(110)
DE
(21)
MD
(10)
AK
(1)
HI
(6)
GU
(1)
PR
(9)
Total Sites*
0 - 9
10 - 19
20 - 49
> 49

SOURCE: CERCLIS

* Total of Listed and Proposed Sites, both Federal and Non-Federal , as of September 1988.

number of sites that have been added to the NPL annually for the years FY83 through FY88 is shown in Exhibit 5.1-1.

Exhibit 5.1-1
HISTORICAL NATIONAL PRIORITIES LIST SITES

Fiscal year	Annual Number of Sites Added	Cumulative Total
1988	0	797*
1987	99	802
1986	170	703
1985	3	541
1984	132	538
1983	406	406

* This total reflects the fact that eight sites were deleted from the NPL in FY86 and five sites were deleted in FY88.

SOURCES: Report to Congress on Progress Toward Implementing Superfund: Fiscal Year 1987, OERR, April 1989; National Priorities List, Supplementary Lists and Supporting Materials, OERR, June 1988; 53 FR 33811, September 1, 1988.

EPA Regional offices, states, and Indian tribes jointly identify sites. EPA Regional offices conduct a quality control review of state-nominated sites, and may assist in the investigation, monitoring, and scoring these sites. EPA Headquarters conducts further quality assurance audits to ensure scoring accuracy and consistency.

Sites also may be listed on the NPL by state designation. A state may designate a single site as the state's top priority. A state top priority site will be listed on the NPL even if its HRS score is lower then 28.5.

Also, in rare instances, EPA may list, under section 300.66(b)(4) of the NCP, certain sites with an HRS scores below 28.5. Such sites may qualify for the NPL if all of the following occur:

- The Agency for Toxic Substances and Disease Registry of the U.S. Department of Health and Human Services has issued a health advisory that recommends restricting access of persons to the site;
- EPA determines that the release poses a significant threat to public health; and

- EPA anticipates that it will be more cost-effective to use its remedial authority than to use its removal authority to respond to the release.

EPA proposes sites for listing on the NPL and solicits public comment on the listing in the *Federal Register*. Based on the comments and further EPA review, the Agency determines final scores and lists as final those sites that meet the listing criteria. When proposed sites become final, they are placed on the NPL in groups of fifty on the basis of their assigned HRS scores. Federal facilities are listed in a separate section in similar groups.

Because EPA reviews proposed sites on a case-by-case basis, not all sites from a specific update will be finalized simultaneously. For example, final rule number seven will include sites from update number six and update number nine. Final rules number eight and number nine will consist of sites proposed in updates number seven and number eight, and any previously proposed sites that have not yet been finalized. Exhibit 5.1-2 illustrates the NPL listing process.

5.2 Sites Deleted from the National Priorities List

The Agency initiated deletion activities for 11 sites during the fiscal year. Five sites were actually deleted from the list.

- April 18, 1988 deletions:

  Mountain View Mobile Home Estates, Globe, Arizona;
  Middletown Road Dump, Annapolis, Maryland; and
  Harris (Farley Street), Houston, Texas.

- September 1, 1988 deletions:

  Tri-City Oil Conservationist, Inc., Tampa, Florida; and
  Varsol Spill, Miami, Florida.

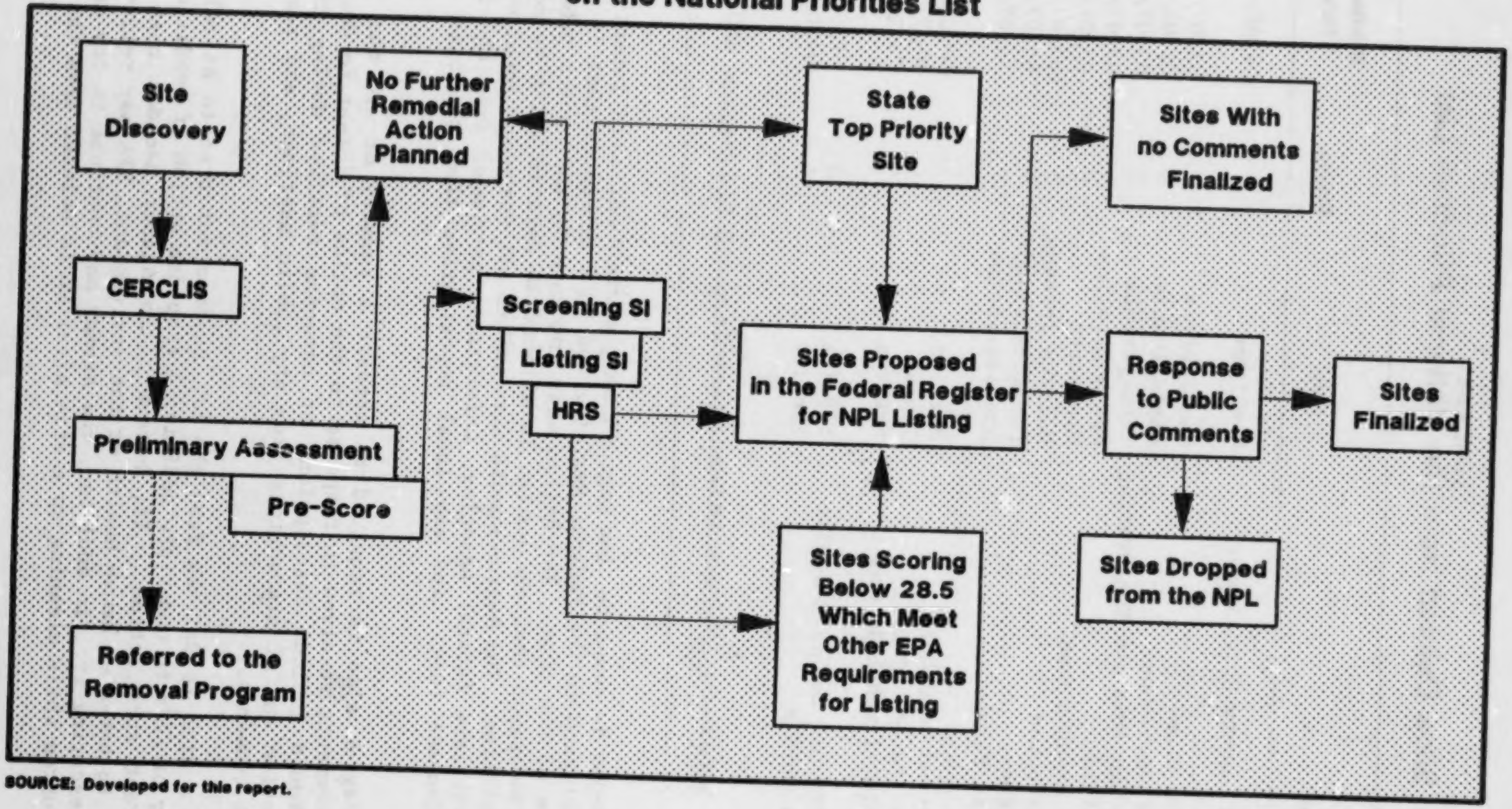
Exhibit 5.2-1 lists the sites that have been deleted from the NPL since the inception of Superfund.

The Agency deletes a site from the NPL when it determines that no further response action is required at the site. In order to make that determination, the Agency will consider whether any of the following three criteria have been met: (1) EPA and the state must determine that the PRPs or other parties have taken all appropriate response action at the site; (2) the Agency or the state must have implemented all appropriate fund financed response action, and determined that no further cleanup by PRPs is necessary; or (3) EPA and the state must have concluded, based on the remedial investigation, that the site poses no significant threat to human health or the environment and, therefore, does not warrant remedial action.

When the EPA Regional Administrator has approved the Site Close Out Report (SCOR), the Agency may begin deletion activities for a site. First, the Region and the state must agree that the site is ready for deletion. Second, the Region must prepare a deletion docket that contains all pertinent information supporting the Region's recommendation that the site be deleted. When the

Exhibit 5.1-2

The Process for Placement of a Site on the National Priorities List


Site Discovery
CERCLIS
Preliminary Assessment
Pre-Score
Referred to the Removal Program
No Further Remedial Action Planned
Screening SI
Listing SI
HRS
State Top Priority Site
Sites Proposed in the Federal Register for NPL Listing
Sites Scoring Below 28.5 Which Meet Other EPA Requirements for Listing
Sites With no Comments Finalized
Response to Public Comments
Sites Dropped from the NPL
Sites Finalized

SOURCE: Developed for this report.

Exhibit 5.2-1

Sites Deleted from the National Priorities List

Site Name	State	Region	Deletion Date
Gratiot County Golf Course	Michigan	5	09/08/83
Friedman Property	New Jersey	2	03/07/86
Enterprise Avenue	Pennsylvania	3	03/07/86
Lehigh Electric and Engineering	Pennsylvania	3	03/07/86
PCB Spills	North Carolina	4	03/07/86
Morris Arsenic Dump	Minnesota	5	03/07/86
PCB Warehouse	Mariana Islands	9	03/07/86
PCB Wastes	Pacific Islands	9	03/07/86
Taputimu Farm	American Samoa	9	03/07/86
Middletown Road Dump	Maryland	3	04/18/88
Harris (Farley Street)	Texas	6	04/18/88
Mountain View Mobile Homes	Arizona	9	04/18/88
Tri-City Oil Conservationist	Florida	4	09/01/88
Varsol Spills	Florida	4	09/01/88

SOURCE: Superfund Site Completions and Deletions from the National Priorities List, HSCD/OERR, October 25, 1988.

deletion docket is complete, the Region must prepare a notice of intent to delete that is published in the *Federal Register* and in a newspaper that is available in the area of the site. The Region must announce in the notice published in the local newspaper that the public is allowed 30 days in which to comment on the site deletion. The Region should also inform all state and local officials, PRPs, appropriate federal agencies, enforcement personnel from the Office of Regional Counsel (ORC), and any local repositories that the site is to be deleted.

The Region also is required to prepare a summary of all the local and national comments received in response to the notice of intent to delete. The summary should include descriptions of comments received during the public comment period and of transcripts from any public meetings, and responses to all of the comments.

When a site is deleted from the NPL it does not need to be relisted for the Agency or PRPs to undertake additional response action if conditions at the site warrant such action. If, however, the Agency decides that the site continues to threaten human health or the environment, EPA may relist the site without rescoring it. In addition, the Agency may continue to try and recover costs incurred while cleaning up a site after it is deleted from the NPL.

5.3 Revisions to Listing Policy

In fiscal 1988, the Agency solicited comments on whether EPA should take an expanded approach for deferring sites to other regulatory authorities for needed corrective action. The Agency also expanded the NPL/RCRA listing criteria, and revised the policy on determining when a RCRA facility owner/operator is unwilling to pay for corrective action; EPA also took comment on the advisability of modifying the policy for listing RCRA sites where the owner or operator is unable to pay for corrective action.

5.3.1 Deferred Listing Policy

In the past, the Agency has deferred the listing of sites on the NPL when certain other authorities were found to be capable of accomplishing needed corrective action. To date, this deferral policy has been limited to sites that can be addressed by the Subtitle C corrective action authorities of the Resource Conservation and Recovery Act (RCRA) or sites that are subject to Nuclear Regulatory Commission regulation. In the proposed revisions to the NCP, the Agency solicited comment on a policy to expand deferral to include other federal and state authorities. The Agency will not go forward with any expanded deferral approach until the significant public and Congressional concerns have been fully addressed and resolved.

5.3.2 Additions to Criteria for Listing RCRA Sites

In addition to updating the NPL in the June 24th proposed rule, noted above, the Agency amended the policy regarding RCRA sites by adding new categories of RCRA sites as appropriate for listing on the NPL. Under current policy, the Agency recognizes three categories of RCRA facilities that appear to warrant listing on the NPL:

- Facilities owned by persons who are bankrupt;
- Facilities that have lost RCRA interim status and for which there are additional indications that the owner or operator will be unwilling to undertake corrective action; and
- Facilities, analyzed on a case-by-case basis, whose owner/operators have demonstrated a clear history of unwillingness to undertake corrective action.

RCRA sites are currently appropriate for listing only if necessary corrective actions under RCRA are unlikely to be performed, or if certain other criteria for listing are met.

The four new categories of RCRA sites are in accordance with the NPL policy concerning sites subject to Subtitle C corrective action authorities of RCRA. First, the Agency has decided to place on the NPL "non- or late-filers" under RCRA that also score 28.50 or more on the HRS. These are facilities that were treating, storing, or disposing of hazardous waste after November 19, 1980, but did not file a Part A permit application by that date and have little or no history of compliance with RCRA.

Second, the Agency has decided to add to the NPL RCRA facilities scoring 28.50 or more and that have permits that pre-date the Hazardous and Solid Waste Amendments (HSWA) of 1984. Permits acquired prior to HSWA do not require owners/operators of facilities to perform corrective action for releases from solid waste management units, and the Agency does not have the authority, until the permit is renewed, to modify such pre-HSWA permits to include RCRA corrective action. For such sites, it could be 1994 before the Agency will be able to modify some permits to include corrective action. EPA believes it is appropriate to include on the NPL facilities with pre-HSWA permits that have HRS scores greater than or equal to 28.5.

Third, EPA had decided to include on the NPL these RCRA facilities scoring 28.50 or more that are "protective filers." Protective filers are facilities that filed Part A permit applications as treatment, storage, or disposal facilities (TSDFs) as a precautionary measure only and which are, in fact, generators, transporters, or recyclers of hazardous waste. Presently, protective filers are not subject to Subtitle C corrective action authorities. Thus, the Agency will propose them for listing on the NPL.

The fourth category of RCRA sites that EPA has decided is appropriate for inclusion on the NPL is converters (scoring 28.50 or more on the HRS). Facilities fall under the converter category if they previously treated or stored RCRA Subtitle C hazardous wastes but now only generate hazardous substances. Although EPA, under RCRA section 3008(h), has the authority to compel corrective action at such sites, converters have not been a priority of the RCRA corrective action program. The program focuses primarily on treatment, storage, and disposal facilities. Thus, EPA has not routinely reviewed converters under RCRA Subtitle C, and the Agency believes that such sites should be included on the NPL where they present a threat to human health or welfare or the environment.

5.3.3 Revisions to the Unwillingness and Inability-to-Pay Criteria

EPA's original policy for deferring RCRA facilities from the NPL stated that RCRA Subtitle C facilities -- those facilities treating, storing, and/or disposing of hazardous wastes -- would not be placed on the NPL, and therefore Fund money could not be expended for cleanup, unless the owner or operator of the facility was either unable or unwilling to pay for corrective action. During the fiscal year, EPA published a revised policy for determining an owner or operator's unwillingness-to-pay, and took comment on a draft policy for determining an owner or operator's inability-to-pay.

5.3.3.1 Unwillingness

The Agency issued a revised policy on August 9, 1988, on how to determine that an owner or operator of a RCRA facility is unwilling to perform corrective action at a facility. Under the previous policy, determination of the unwillingness of an owner or operator to undertake corrective action was done on a case-by-case basis, often took several years, and required EPA to establish that the owner or operator had a history of failing to take corrective action required by Agency or state orders or permits.

Under the revised policy, an owner or operator's unwillingness generally will be determined by more objective means such as failure to comply with an order after the order is upheld in an administrative appeal or by a court.

5.3.3.2 Inability

On August 9, 1988, the Agency also proposed to revise the policy for determining when a facility owner/operator is unable to pay for corrective action. Currently, only an owner/operator who declares bankruptcy is considered unable to pay. EPA proposed two options for the inability-to-pay criteria. The first option the Agency is considering involves comparing the cost of the site remedy proposed by EPA with the financial status of the owner/operator. The comparison (and subsequent listing, if appropriate) would be made only after a RCRA Facility Investigation (RFI) and Corrective Measures Study (CMS) for the facility are completed and an EPA-proposed remedy is publicly available. This would ensure that the cost of cleanup is fairly well established before the comparison is made. EPA is proposing to place a RCRA site on the NPL if the estimated cost of the EPA-proposed remedy is greater than the tangible net worth of the owner/operator.

The Agency recognizes, however, that the owner/operator or a citizens' group may successfully challenge EPA's selection, and a lower cost option -- one that the facility could afford to pay -- might eventually be selected. To accommodate such situations, EPA also proposed an alternative criterion. Under this alternative, EPA would place a RCRA site on the NPL if the estimated cost of the least expensive remedy considered in the CMS (excluding "no action"), or the remedy ultimately selected after any appeals, is greater than the tangible net worth of the owner/operator.

In response to public comment on the proposed rule, the Agency is expected to further clarify certain aspects of the proposed inability-to-pay criteria before publication of a revised policy.

6.0 ENFORCEMENT PROGRAM ACTIVITIES

Enforcement efforts have been critical to the Superfund program's progress, helping to bridge the gap between the huge costs of cleaning up all of the serious hazardous waste sites in the nation and Superfund's limited financial resources. The role of potentially responsible parties (PRPs) in conducting Superfund site cleanups has become increasingly important. Overall, in FY88 the Superfund enforcement program met or exceeded most targets, resulting in record-setting accomplishments for the year. From the beginning of CERCLA through the end of the fiscal year, EPA has reached settlements for PRPs to conduct responses worth more than one billion dollars. These responses include emergency removals of hazardous substances, remedial investigation/feasibility studies, and remedial actions. The entire enforcement process is illustrated within the context of the Superfund cleanup process in Exhibit 6.0-1.

6.1 Overview of Enforcement Activities

RI/FS "first starts" by PRPs exceeded the 1988 target of 35 sites, with a total of 48. Exhibit 6.1-1 demonstrates the increased role of PRPs in the conduct of first start RI/FSs. Whereas PRPs conducted only 38 percent of first start RI/FSs in FY87, they conducted 48 percent in FY88, and are expected to conduct 55 percent in FY89. RODs based on PRP-conducted RI/FSs increased significantly during the fiscal year, for a total of 43 initial RODs and 7 subsequent RODs signed. PRPs undertook 21 remedial action starts, exceeding the target of 20. Currently, EPA is working toward the goal of having PRPs responsible for funding 50 percent of all cleanups.

Under Superfund, PRPs are liable for either cleaning up hazardous waste sites themselves or reimbursing the government or other PRPs who do the work for expenses incurred in cleaning up the sites. EPA uses its enforcement authority to identify, notify, and negotiate with PRPs in an attempt to reach a settlement whereby PRPs either conduct or pay for cleanups. EPA may negotiate voluntary cleanups at different points in the clean-up process. The Agency usually negotiates with the PRPs involved (1) before the RI/FS, in an attempt to get them to perform the study as well as carry out the selected remedy, or (2) after the RI/FS, in an attempt to get the parties to implement the selected remedy.

In the case where settlement negotiations do not result in a successful agreement, EPA has two alternative courses of action it can pursue. The Agency may either issue an administrative order and/or thereafter seek a court order under CERCLA section 106 to require PRPs to perform the cleanup themselves, or it can use Superfund money to finance a government action and then seek recovery of such costs from PRPs through negotiations or the courts under section 107.

6.1.1 Potentially Responsible Party Involvement

The search for PRPs is the cornerstone of the Superfund enforcement program. This is the first step in the enforcement process, beginning after the site discovery. An initial, preliminary search to identify obvious PRPs is essential at this time, especially at removal sites where immediate action is necessary, to determine whether PRPs are available to perform or finance the cleanup. A formal PRP search is also conducted later on in the enforcement process, at the

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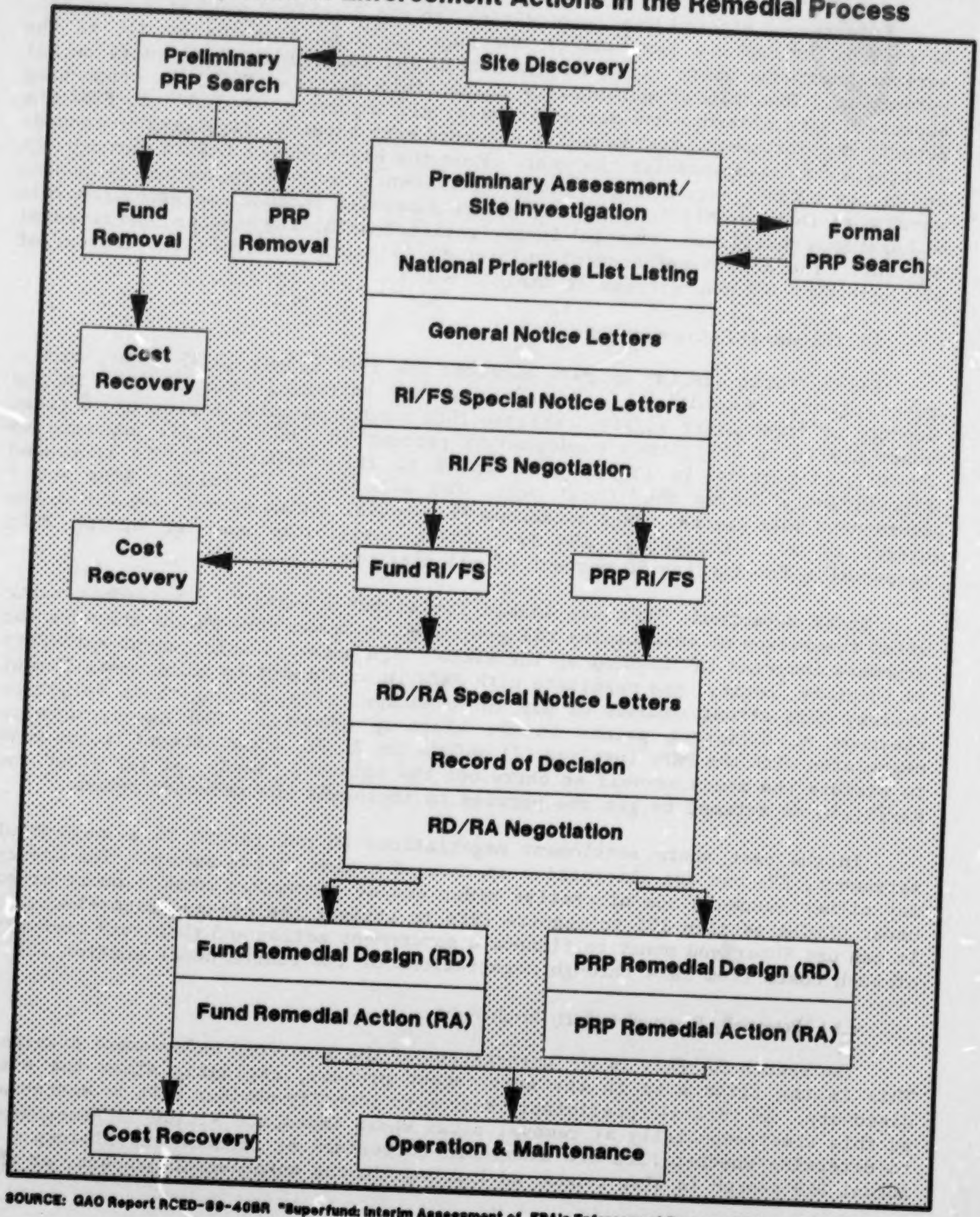
Exhibit 6.0-1

Sequence of Enforcement Actions in the Remedial Process


Preliminary PRP Search
Site Discovery
Fund Removal
PRP Removal
Preliminary Assessment/ Site Investigation
Formal PRP Search
National Priorities List Listing
Cost Recovery
General Notice Letters
RI/FS Special Notice Letters
RI/FS Negotiation
Cost Recovery
Fund RI/FS
PRP RI/FS
RD/RA Special Notice Letters
Record of Decision
RD/RA Negotiation
Fund Remedial Design (RD)
Fund Remedial Action (RA)
PRP Remedial Design (RD)
PRP Remedial Action (RA)
Cost Recovery
Operation & Maintenance

SOURCE: GAO Report RCED-89-40BR "Superfund: Interim Assessment of EPA's Enforcement Program," October 12, 1988.

time a site is submitted by an EPA Region to Headquarters for inclusion on the NPL.

During the search effort, EPA tries to establish the liability and financial capability of those responsible for site cleanup. PRPs may include individuals, corporations, or other entities that are past or present owners of sites, as well as generators or transporters or those who arranged for disposal of waste that contributed hazardous substances to the site. EPA then informs PRPs of their potential liability through the use of general notice letters, and gives them an opportunity to conduct the site cleanup work. When PRPs are unwilling to undertake the work, EPA may attempt to negotiate an agreement, and may take enforcement action to compel participation in cleanup efforts if an agreement is not reached.

The PRP search thus supports EPA's policy to secure cleanups by PRPs instead of using Superfund monies. Even when Superfund monies are used to finance the cleanup, a PRP search must be completed for cost recovery actions to be taken in the future. To ensure the timeliness and adequacy of PRP searches, EPA has hired at least one civil investigator for each of its ten Regions. In addition, the Agency is auditing certain contract PRP searches to determine their adequacy.

6.1.2 Guidance on Potentially Responsible Party Involvement

In addition, in FY88, EPA issued *Guidance on Funding CERCLA State Enforcement Actions at NPL Sites*. This guidance addresses the conditions states must consent to when applying for and receiving cooperative agreement funding to conduct enforcement activities. These activities include PRP searches, negotiating settlements, and oversight of PRP activities. In FY89 EPA plans to issue an additional important guidance document which will deal with issues surrounding PRP involvement in the enforcement process. *Guidance on Potentially Responsible Party Participation in Remedial Investigations and Feasibility Studies* establishes policy and procedures for governing PRP involvement in RI/FS under CERCLA. It addresses, in particular: circumstances under which PRPs may conduct the RI/FS, development of enforceable agreements governing RI/FS activities, PRP oversight, dispute resolution, correction of RI/FS process deficiencies, and PRP participation in the Agency's RI/FS activities.

6.1.3 Enforcement Under CERCLA Section 106

EPA can use its authority under section 106 of CERCLA to issue an administrative order to compel a PRP to perform removal or remedial actions at a site. An administrative order summarizes the terms of a clean-up agreement, including sampling requirements, clean-up techniques, and timetables. EPA either negotiates the administrative order with the PRP, or develops the order and issues it on its own. For remedial actions, agreements with PRPs to conduct the work must be in the form of a judicial consent decree.

Progress During Fiscal 1988

In April 1988, the Administrator requested that each Region identify one or more section 106 cases for a unilateral enforcement action, in an effort to increase PRP involvement in site clean-up activities. The Office of Enforcement and Compliance Monitoring (OECM) and OSWER undertook an initial screening of sites, looking especially at NPL sites where Records of Decision (RODs) were signed or would be signed in the near term. As a result, a total of 22 sites were identified for section 106 referrals. By the end of FY88, four of these cases were settled and two were referred. Of the remaining 16 sites, several are in the final stages of settlement negotiations; several others have had the projected ROD signature date delayed and are thus not yet ready for referral.

In addition, EPA issued 14 unilateral administrative orders under section 106 during FY88 for RD/RA with a potential value of $136 million. Of these, seven resulted in RD/RA settlements with an approximate total value of $50 million, one resulted in a settlement in the form of a judicial consent decree, two cases were referred to the Department of Justice (DOJ) for further action, and the remaining orders are waiting for a PRP response. The Agency referred one additional case to DOJ for injunctive relief for an RI/FS and RA, the value of which has yet to be determined. If violated, these orders are enforced by the courts.

A total of 116 administrative orders were issued for removal activities with a potential value of over $78 million dollars. This number is a 300 percent increase over the number of FY87 removal orders. Of the 116 administrative orders, 94 resulted in compliance, with a total value of over $67 million. One hundred and two of these administrative orders resulted in actual removal starts. For RI/FS activities, a total of 77 administrative orders were issued with a total value of over $85 million (Exhibit 6.1-2). The combined total of 207 administrative orders represents a 100 percent increase over the 100 total administrative orders issued during FY87. The dollar amounts cited for settlements, not amounts reimbursed to the Fund, represent the estimated value of the remedial activities PRPs have agreed to undertake.

Initiatives to Increase the Number of CERCLA Section 106 Actions

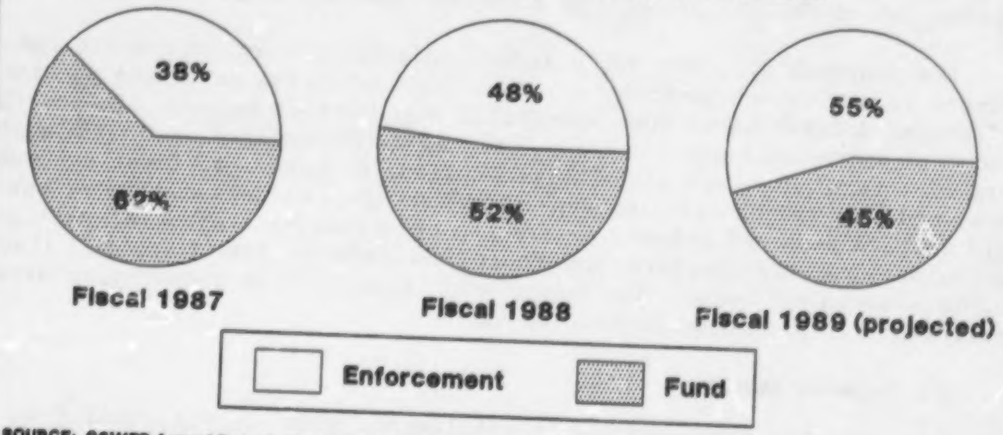
During February 1988, senior Agency and DOJ officials met to explore new methods to increase the effectiveness of the Agency's use of section 106 authorities. A workgroup was established to investigate EPA's policies and practices to assure the proper balance of incentives and disincentives for PRPs at Superfund sites. This workgroup concluded that the use of unilateral administrative orders will frequently provide a strong incentive to settlement and recommended that there should be a bias in favor of issuance of a unilateral administrative order where some or all of the PRPs are unwilling to enter into settlements.

Key Action

In March 1988, a consent decree was negotiated to resolve Inmar Associates' failure to comply with a CERCLA section 106 order issued by EPA. The consent decree, lodged in district court, requires that a lump sum payment of $545,000 be made by Inmar. This resulted in the largest penalty, $315,000, ever imposed by EPA upon a party pursuant to CERCLA section 106(b). In addition, the settlement resulted in a full 100 percent reimbursement of the approximately $152,000 in response costs incurred at the waste site.

Exhibit 6.1-1

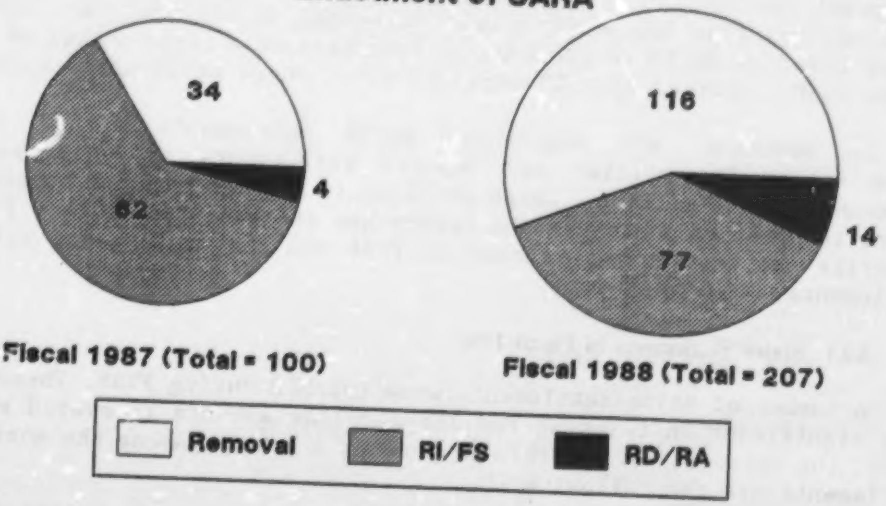
The Increasing Enforcement Role in Remedial Investigation/Feasibility Study First Starts



SOURCE: OSWER Annual Report: Fiscal Year 1988, November 1988.

Exhibit 6.1-2

Administrative Orders Issued Since the Enactment of SARA



SOURCE: OSWER Annual Report: Fiscal Year 1988, November 1988.

6.1.4 Interaction with the Department of Justice

In cases where PRPs have not negotiated a settlement to clean up their sites, EPA's attorneys and enforcement staff, working with the Department of Justice (DOJ), can bring legal action against the PRPs. EPA refers cases to DOJ, which pursues judicial actions to compel private party clean up under section 106 of CERCLA, or actions for cost recovery under section 107.

EPA, through DOJ, may ask a federal district court to require the PRP to respond to any threat posed by a site. The court also may agree to enter into a "consent decree" based upon successful negotiations between EPA and the PRP. A consent decree will provide for a clean-up action managed by the PRP with long-term EPA oversight. EPA also has the option, as noted, to first use Superfund money and then to recover clean-up costs from the PRP. Under CERCLA, courts can hold certain past and present owners and operators of a site, as well as waste generators and transporters and those who arrange for disposal, liable for complete clean-up costs. The number and value of cost recovery referrals and settlements is presented in Section 6.3.

6.2 Negotiated Settlements

In FY88, EPA negotiated more settlements than in any prior year of the Superfund program. A total of 97 RD/RA negotiations were begun, resulting in 55 settlements with an approximate total value of $320 million. This total included 29 consent decrees that are worth approximately $270 million in RD/RA work. PRPs signed another 19 consent decrees for RD/RA that are in the process of government concurrence. The value of the response is yet to be determined. Also, there were seven sites where the Agency issued a unilateral administrative order for RD/RA which resulted in settlements worth approximately $50 million. The 29 consent decrees lodged represents a 300 percent increase over the number of decrees lodged in FY87. There were 50 PRP-lead RODs in FY88, and of these 81 percent resulted in settlement agreements. Those settlements with response costs of less than $30 million were delegated to the Regions. EPA expects a record number of RD/RA settlements in FY89 because a large number of RODs signed in the fourth quarter of FY88 were for sites where settlements were expected.

In addition, EPA negotiated RI/FS settlements at 77 sites worth approximately $85 million and removal settlements at 94 sites valued at approximately $67 million. These settlements are for first or subsequent starts or for takeover of a project the Agency has started. Exhibits 6.2-1 and 6.2-2 summarize the settlements reached in FY88 and the approximate value of these settlements.

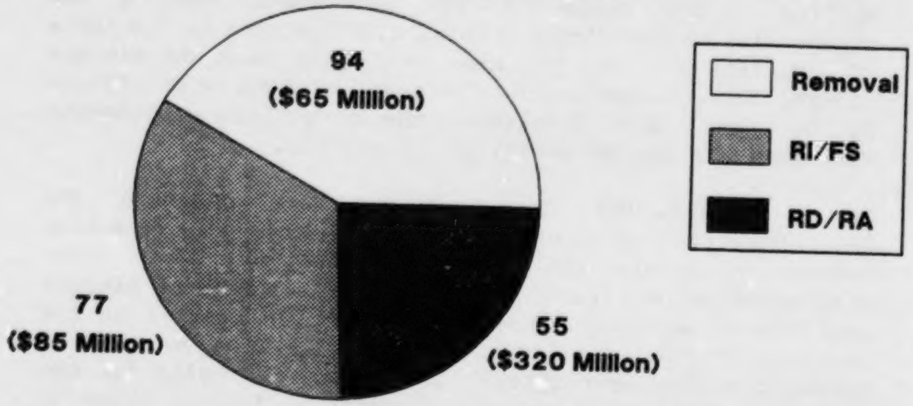
6.2.1 Major Settlements in Fiscal 1988

A number of major settlements were reached during FY88. These settlements were significant in terms of the large dollar amounts recovered and, for some cases, the agreement of the PRPs to conduct a remedy. Among the most significant settlements are the following:

- *Tybouts Corner Landfill (Delaware)*: This site is ranked number 2 on the NPL and has been designated by the State of Delaware as a top priority site. After nearly two years of

Exhibit 6.2-1

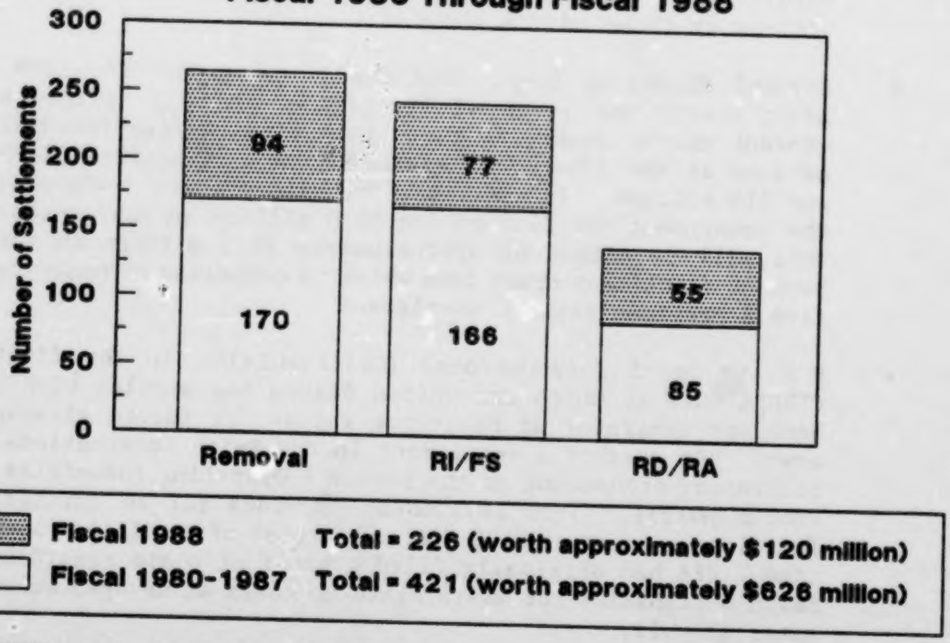
Number and Value of Superfund Settlements in Fiscal 1988



SOURCE: OSWER Annual Report: Fiscal Year 1988, November 1988.

Exhibit 6.2-2

Number and Value of Superfund Settlements, Fiscal 1980 Through Fiscal 1988



SOURCE: OSWER Annual Report: Fiscal Year 1988, November 1988.

negotiations between the Government and PRPs to resolve a lawsuit filed in 1980, EPA reached a mixed-funding settlement under which seven PRPs will conduct private RD/RA operations. The remedy selected by EPA in a ROD dated March 6, 1986, has an estimated cost of between $20 and $60 million. The terms of the settlement require the signatories to contribute a total of 93 percent of the costs of the remedy. EPA is also reviewing four *de minimis* consent decrees executed by fourteen third party defendants in the case. When finalized, the *de minimis* settlements will generate approximately $1.73 million.

- *Cannon Engineering Corp. (CEC) (New Hampshire and Massachusetts)*: On August 3, 1988, two consent decrees were lodged to settle the Cannon Engineering case. The comprehensive settlement, combined with earlier *de minimis* settlements and administrative orders, will result in the recovery of $48.1 million of the total $58.5 expected to be incurred at the four sites. The settlement calls for the PRPs to conduct the remaining response actions at three of the sites (two RDs/RAs and one removal action), with an estimated total value of $16.1 million. PRPs will also pay approximately $17.1 million in past costs and settlement premiums connected with the fourth site in the case. In addition, the comprehensive settlement accompanies two earlier *de minimis* settlements which are expected to recover $13.4 million. Also, three previous administrative orders have been negotiated with various PRPs in the case, resulting in the performance of $1.5 million on response actions at three of the sites.

- *Seymour Recycling Corp. (Indiana)*: On August 17, 1988, after nearly ten years of litigation, the U.S. lodged a consent decree requiring the settlors to perform remedial actions at the site at an estimated cost of between $15.5 and $18 million. In addition, the settlors will reimburse the government for $6.5 of its $9.3 million in past costs; this will be offset by approximately $6.5 million in the Seymour settlement trust fund which is comprised of proceeds from a previous cashout settlement.

- *U.S. v. Smith International (California):* In the first CERCLA case in which the United States has settled with a bankrupt generator of hazardous wastes for future cleanup costs, EPA reached a settlement in the Smith International bankruptcy proceeding at the Region 9 Operating Industries, Inc. Landfill. This settlement provides for an initial, immediate payment of $100,350 and a total of $5 million over time. EPA had originally filed a proof of claim regarding Smith's liability for waste clean-up costs at several other sites as well.

- *Rocky Mountain Arsenal (Colorado)*: On February 1, 1988, a consent decree was signed by the Army, EPA, and the Department of the Interior, the Agency for Toxic Substances and Disease Registry, DOJ, and Shell Oil Company. This decree, resolving a 1983 civil action between the Army and Shell, requires the performance of 13 interim response actions, an RI/FS, and a remedy. The estimated cost of the entire cleanup is between $750 million and $1 billion.

- *U.S. v. Conservation Chemical Company (Missouri)*: This is one of the longest running hazardous waste cases in U.S. history, initiated in 1980 under RCRA Section 7003 and later amended to include CERCLA sections 106 and 107 actions. A consent decree was approved in April 1988 to settle this case, with the overall cost of site remediation expected to be over $20 million. The consent decree approved in court requires the original waste generators, with contributions from the site owner/operator, to remediate the site and to provide over $2.1 million in reimbursement to the Trust Fund.

- *Tysons Dump (Pennsylvania)*: A settlement was reached with the four PRPs responsible for waste at the Tysons Dump site. The amended final ROD describing the remedial design was signed in March 1988. This settlement included an agreement for the PRPs to conduct remedial actions at the site, with an estimated total value of $10.2 million. In addition, the PRPs also agreed to fully reimburse costs incurred during an initial removal action at the site in January 1983, and pay all oversight costs at the site during the remedial action phase.

- *Renora Site (New Jersey)*: A consent decree was lodged requiring the PRPs to conduct the remedial design and remedial action at the site. It also recovers past federal and state response costs. The consent decree contains a convenant not to sue for the phase of the cleanup involving bioremediation, contingent on the determination of whether bioremediation is a permanent remedy. If the treatability study does not prove that bioremediation is a permanent remedy, EPA will reopen the Record of Decision (ROD). In addition, the government plans to issue unilateral administrative orders pursuant to CERCLA section 106 requiring all nonsettling PRPs to comply with the provisions of the settlement.

- *Anaconda Smelter (Montana)*: Pursuant to an administrative order on consent under Section 106 of CERCLA, the PRP conducted an expedited RI/FS at the Mill Creek site, part of the larger Anaconda Smelter complex. The interim remedy selected in the ROD, dated October 2, 1987, is permanent relocation of residents, demolition of houses, and temporary site stabilization. The PRP is responsible, under the

> lodged consent decree, for costs incurred by the federal and state governments in implementing the interim remedy. The Agency reserves the right to conduct further investigation and CERCLA response actions at the Mill Creek site, including a permanent remedy.

Since the passage of SARA, EPA has developed a number of mechanisms to facilitate and expedite the settlement process. These include special notice letters, arbitration, *de minimis* settlements, covenants not to sue, and mixed funding settlements. Each of these mechanisms is discussed in turn below.

6.2.2 Notice Procedures

Notice procedures help expedite the enforcement process by promoting negotiations between EPA and private parties. The Agency uses notice letters to inform PRPs of their potential liability and to offer them an opportunity to enter into negotiations about conducting response activities. Notice letters also serve to initiate the exchange of information which is vital to enforcement negotiations. The notice process involves three separate steps: the general notice, the RI/FS special notice, and the RD/RA special notice. On February 23, 1988, EPA issued interim guidance (53 *FR* 5298) on procedures for drafting notice letters, negotiations with PRPs, and information exchange.

General Notice

EPA issues a general notice to PRPs to inform them of their potential liability for future response costs, to promote further information exchange, and to initiate the process of "informal" negotiations. Issuance of the RI/FS special notice occurs at the discretion of the Regions. The decision about when to issue the RI/FS special notice depends upon the nature of the remedy and the existence or involvement of PRPs.

The RI/FS special notice generally is sent to a PRP no later than 90 days prior to the scheduled start of the RI/FS. This procedure invokes a moratorium on EPA's RI/FS activities and triggers a period of formal negotiation. Until the conclusion of these RI/FS activities, the Region actively manages the negotiation process by transferring information to the PRPs.

Special Notices

The RD/RA special notice begins a period for formal negotiation and invokes a 60-day moratorium on EPA's activities. OSWER has established three approaches for issuing the RD/RA special notice (in order of preference): issuing the special notice when the draft FS and the proposed plan are released for public comment, issuing the special notice prior to the release of the draft FS and the proposed plan, or issuing the special notice after the ROD is signed (this requires a waiver from EPA Headquarters). The idea behind these approaches is to ensure EPA's ability to conduct meaningful negotiations, to maintain the integrity of the public's participation, and to minimize delays in implementing the RD/RA.

For 60 days after the special notice is issued, EPA formally negotiates with PRPs about taking over the RD/RA. EPA will discontinue negotiations and either issue a unilateral administrative order, or begin a fund-lead cleanup if it does not receive a good faith offer at the end of the 60-day moratorium. If EPA receives a good faith offer from PRPs, the moratorium period may be extended to a total of 120 days (or more).

Historically, RD/RA activities have been delayed due to extension of the negotiating period past the moratorium deadline, issuance of special notices much later than the ROD, and a lack of resources in certain Regions. An analysis performed by the Office of Waste Programs Enforcement (OWPE) showed that for sites where the special notice is not issued until after the remedy is selected, RD/RA negotiations continued an average of 70 days past the initial 60 day moratorium.

EPA has issued recommendations for improving and expediting notice procedures in order to reduce delays they have caused in the remedial process. In addition, EPA has provided guidelines for the Regions to follow in managing the enforcement negotiation process. Emphasis has been placed on cutting off negotiations after the first 60 days when PRPs do not make a definitive good faith offer. To prevent PRPs from exceeding the deadline, EPA will extend the total 120-day moratorium only rarely. Also, Regions have placed emphasis on issuing special notices in a timely manner, either with the proposed plan or within a week of the signing of the ROD.

6.2.3 Arbitration

Under CERCLA section 122(h)(2), as amended by SARA, the Administrator (or the head of any other department or agency authorized to undertake a response action under CERCLA) may use arbitration as a means of settling certain section 107 cost-recovery claims. Arbitration may be used in accordance with regulations promulgated by EPA, or other authorized agencies or departments, after consultation with the U.S. Attorney General.

On August 4, 1988, a proposed regulation providing EPA arbitration procedures for small Superfund cost recovery claims was published in the *Federal Register* for public comment. This regulation. when finalized, will implement CERCLA section 122(h)(2), which authorizes EPA to use arbitration as a method of settling section 107 cost recovery claims when the total response costs at the site do not exceed $500,000 (excluding interest).

6.2.4 *De Minimis* Settlements

During FY88, there were 12 settlements which involved *de minimis* contributors of waste as a group. In these settlements, the *de minimis* component was worth about $16 million, or 13 percent of the total site costs of $129 million.

De minimis settlements involve parties that contributed very small amounts of hazardous waste at a site. At some Superfund sites there are hundreds of PRPs; EPA therefore, can reduce the number of parties involved by settling with *de minimis* contributors as a group. As a result, the Agency conserves resources that might be expended in lengthy negotiations, and *de minimis* parties are able to end their involvement more quickly. Negotiations with other PRPs are thus made more manageable.

CERCLA section 122(g) authorizes EPA to enter into expedited settlements with *de minimis* parties provided that the settlement is in the public interest and involves a minor portion of the response costs at the facility. Section 122(g) includes two types of *de minimis* parties: *de minimis* contributors (generators and transporters) and *de minimis* landowners. A party may qualify as a *de minimis* contributor when the amounts and toxicity of hazardous substances contributed by that party are minimal in comparison to other hazardous substances at the facility. A *de minimis* landowner is one who did not conduct or permit the generation, transportation, storage, treatment, or disposal of any hazardous substance at the facility, or acquired the property without knowledge of contamination. In addition, the landowner must not have contributed to the release or threatened release at the facility.

Settlements may be embodied in a consent decree or administrative order, and *de minimis* settlors may be provided with a covenant not to sue. *De minimis* settlors also are entitled to contribution protection. Contribution protection shields settlors from being held liable for more than their rightful share of cleanup costs. On November 12, 1987, EPA published draft language (52 FR 43393) for drafting *de minimis* waste contributor administrative orders on consent and consent decrees.

6.2.5 Covenants Not To Sue

A covenant not to sue excludes a PRP from liability to the United States under CERCLA, including future liability, that results from a release or a threatened release addressed by a remedial action, thus encouraging a PRP to reach an early settlement. These agreements generally include "reopeners" that allow EPA to hold PRPs liable for conditions unknown at the time of the settlement, or if new information indicating that the remedial action is not protective of human health and the environment. In some settlements, such as *de minimis* settlements, covenants may be granted without reopeners.

CERCLA Section 122 (f)(1) authorizes EPA to issue a covenant not to sue if:

- The covenant is in the public interest;
- It would expedite the response;
- The settlor is in full compliance with a section 106 consent decree addressing the release or threatened release; and
- EPA has approved the response action.

6.2.6 Mixed Funding

During FY88, EPA approved two mixed funding settlements, one preauthorized and one for mixed work. In addition, a third mixed funding settlement is still in litigation and has not yet been lodged. Under the terms of each of these settlements, the PRPs were required to contribute over half of the total cost incurred at the respective sites. The two finalized and one pending mixed funding settlements were:

- *McAdoo Associates (Pennsylvania)*: In June, 1988, a preauthorized mixed funding settlement was entered into between EPA and 69 of the 93 PRPs at the McAdoo-Kline Township Superfund site. The settlement calls for the PRPs to conduct the RD/RA, which has an estimated value of $3 million. Of this amount, the PRPs are responsible for 75 percent, or $2.25 million under the settlement, with the remaining 25 percent preauthorized. The PRPs are also required to pay for $793,000 of $993,000 in past costs at the site, as well as 75 percent of future costs.

- *Ottati and Goss (Kingston Steel Drum) (New Hampshire)*: Under the terms of this mixed work settlement, the PRPs are to perform 60 percent of the RD/RA work at the site; EPA will perform 40 percent. The cost of the remedy is $11.6 million. This settlement, however, had not been lodged as of May 1989. The underlying enforcement case is currently in litigation.

- *Harvey and Knott Drum, Inc. (Delaware)*: A mixed funding settlement was reached during October, 1987. The PRPs are to perform the entire RD/RA work at the site; 67 percent of these costs are to be paid by PRPs, with the remaining 33 percent having been preauthorized; the estimated value of the remedy is $10.4 million. In addition, future oversight costs and $1 million of past costs at the site are to be paid by PRPs. The RD is an ongoing process, and RA work began in January 1988.

Mixed funding, authorized by CERCLA section 122(b), occurs when Superfund and PRP funds are used jointly to finance cleanup efforts at a site. To determine if mixed funding is appropriate at a site, EPA evaluates both the most effective means of cleanup and the most effective use of the Agency's resources. Use of mixed funding is most likely to be approved at sites where some parties are willing to settle and to conduct the cleanup, and where there are financially solvent nonsettlors that EPA may pursue. Money from Superfund will not be provided, however, until the cleanup has been completed. PRPs who settle in a mixed funding agreement must pay 100 percent of the clean-up costs, before the initiation of the cleanup process.

When the cleanup is finished and certified as done properly, EPA will reimburse the settling parties for that portion of the costs specified in the settlement agreement. The Agency, meanwhile, sues the parties that refused to settle in order to recover the federal share of the clean-up costs. Mixed funding thus permits cleanups to proceed even in cases where some of the PRPs refuse to settle out of court. On March 14, 1988, EPA issued guidance (53 *FR* 8279) that discusses the factors that are considered in determining whether mixed funding is appropriate for a given site. Mixed funding can be accomplished through pre-authorized claims against the Fund and through "cash outs" or "mixed work."

6.2.7 Nonbinding Allocations of Responsibility

On March 4, 1988, Region 1 proposed a Nonbinding Allocation of Responsibility (NBAR) for use in the RD/RA special notice negotiations for the

Re-Solve site in North Dartmouth, Massachusetts, among the approximately 320 PRPs at the site. This is the first NBAR issued. An NBAR was prepared in this case because of a dispute among the PRPs as to how to allocate cleanup costs for PCBs. Negotiations based on the NBAR resulted in an agreement in principle in September 1988. Under this settlement, the government is expected to recover $9.2 million in past costs spent at the site and receive $23.3 million toward future cleanup efforts.

NBARs are a means by which EPA allocates the total response costs among PRPs at a site. EPA sends NBARs to PRPs at the PRP's request, informing them of the percentage of total site response costs for which they are determined to be responsible. The NBAR, however, is not a statement of damage or liability, nor is it admissible in court as evidence. The major factors considered in determining response cost allocations include the volume, toxicity, and mobility of waste contributed by a PRP, and the nature of the evidence against various PRPs.

Under current Superfund policy, PRPs are expected to determine among themselves the exact allocation of each portion of the cleanup cost. EPA may step in and issue NBARs (normally during the RI/FS) to prevent conflict and delays and to promote a settlement. After receiving an NBAR, PRPs may offer to undertake or finance a cleanup; they are still expected to determine the final allocation of cleanup costs among themselves.

6.3 The Cost Recovery Program Under CERCLA Section 107

Progress in Fiscal 1988

The total amount recovered by the Agency in FY88 cost recovery settlements was greater than that in previous years. A total of $55.6 million was recovered at 121 sites, as compared to the $36 million recovered in FY87 and the $17 million recovered in FY86. This is a 65 percent increase over the total amount recovered during the past fiscal year, and represents 40 percent of the $139 million recovered since the start of the Superfund program (Exhibit 6.3-1). Also, a total of 56 cases with a combined value of $120 million were referred to EPA Headquarters from the Regions in FY88. This total is nearly double that of the 37 cases (with a total value of $66 million) referred to Headquarters from FY81 through FY87 (Exhibit 6.3-2). In addition, 59 cases with an approximate total value of $27 million were referred to DOJ under CERCLA Section 107, and 50 civil actions were filed by DOJ, with an approximate total value of $19 million. A comparison of cost recovery data from FY88 to cost recovery data from all prior years of the Superfund program is presented in Exhibit 6.3-3.

Background

The purpose of the cost recovery program is to seek reimbursement from PRPs for cleanup costs incurred by the government at waste sites. Prior to initiation of the RI/FS by the Agency, parties identified as being potentially responsible for the threat posed by a site are given the opportunity to perform the RI/FS. PRPs are also given the opportunity to conduct any immediate response actions as well as remedial actions determined necessary at the conclusion of the RI/FS. The PRPs, which may include generators and transporters of the hazardous substances involved in the release, as well as

Exhibit 6.3-1

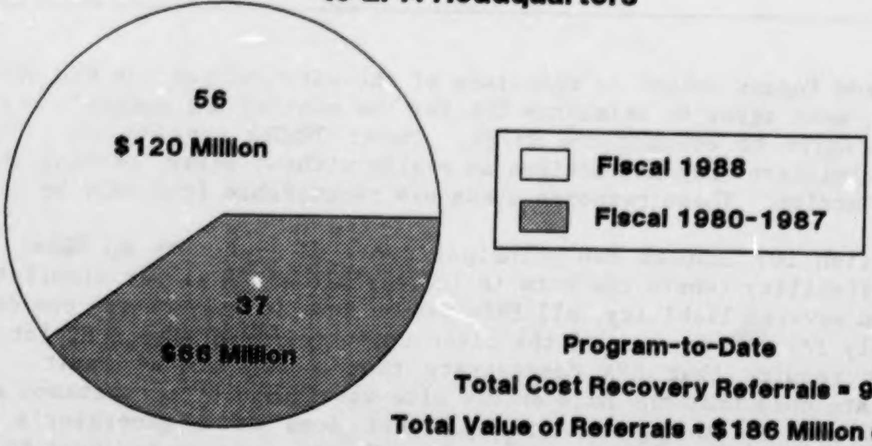
Value of Cost Recovery Settlements By Fiscal Year

Fiscal Year	Total Dollars Recovered
1988	$ 55,600,000
1987	35,755,000
1986	17,300,000
1985	18,000,000
1984	7,000,000
1983	2,000,000
1982	3,000,000
1981	250,000
Total	$138,905,000

SOURCE: The Superfund Progress Report as of September 30, 1988, OSWER, December 29, 1988.

Exhibit 6.3-2

Number and Value of Cost Recovery Referrals to EPA Headquarters



Program-to-Date

Total Cost Recovery Referrals = 93

Total Value of Referrals = $186 Million dollars

SOURCE: OSWER Annual Report: Fiscal Year 1988, November 1988.

Exhibit 6.3-3

Cost Recovery Activities

Civil Actions	FY 1988	Prior to FY 1988	Totals
Referred to EPA HQ from the Regions	56	93	149
$ Value of these actions	120 million	186 million	306 million
Referred to DOJ under CERCLA Section 107	59	252	311
$ Value of these actions	27 million	285 million	312 million
Civil Actions Filed by DOJ	50	221	271
$ Value of these actions	19 million	274 million	293 million
Reimbursement to the Trust Fund	101 million	180 million	291 million

NOTE: Values listed for settlements include accounts receivable, not just amounts collected.

SOURCE: The Superfund Progress Report as of September 30, 1988, OSWER, December 29, 1988.

current and former owners or operators of the site and parties who arranged for disposal, must agree to reimburse EPA for the cost of the Agency's oversight if the PRPs agree to conduct the RI/FS. Under CERCLA section 104, EPA has the power to initiate response actions at a site without delay, pending the outcome of legal action. These response costs are recoverable from PRPs by the Agency.

Section 107 imposes two principal types of liability on PRPs: joint and several liability (where the harm is indivisible), and strict liability. Under joint and several liability, all PRPs can be sued jointly or any one can be sued separately for 100 percent of the clean-up costs for a site. Strict liability does not require that EPA demonstrate that a PRP was at fault. EPA must demonstrate only that the harm at the site was caused by a substance similar to that produced by the generator, and that some of a generator's hazardous substances came to be located at the site. The Agency does not have to establish that the generator acted willfully or negligently.

Cost Recovery Program Guidance Documents

In order to implement the cost recovery program more aggressively, EPA issued two guidance documents in FY88. The first, entitled *The Superfund Cost Recovery Strategy* (OSWER Directive 9832.13, July 29, 1988), provides a framework for planning and initiating actions to recover federal funds expended by EPA or a state during CERCLA response actions. The second, entitled *Guidance on Documenting Decisions Not to Take Cost Recovery Actions* (OSWER Directive 9832.11, June 7, 1988), discusses the information to be included in EPA close-out memoranda written to document the basis of EPA decisions when recovery of unreimbursed Superfund monies is not being sought.

EPA also delegated concurrence on most section 107 cost recovery actions to the Regions on June 17, 1988 (OSWER Directive 9012.10-a). As a result, EPA Regional offices now have a greater amount of authority to resolve section 107 claims without approval from EPA Headquarters; referrals subject to the new criteria for delegating cases to the Department of Justice may now be referred there directly by Regional offices.

The Superfund Cost Recovery Strategy encourages the Regions to seek cost-recovery settlements under section 122(h) to speed up the process and to reduce costs to the government. For settlements of less than $500,000, EPA does not need to obtain approval from the Attorney General. For those cases where there is no settlement, the Region is to consider seven primary factors when deciding which cases to prosecute:

- The dollar amount involved;
- The strength of the case against the PRP;
- The possible defenses;
- The quality of information about a site;
- The ability of the party to pay;
- The statute itself; and
- Other cases on the government's docket.

If, after a review of a case on the basis of these factors the Region decides not to pursue a cost recovery action, the decision is recorded in a cost recovery close-out memorandum. Regions are encouraged to develop cases for litigation for all sites where response costs are greater than $200,000 and a negotiated settlement was unsuccessful. Cases where response costs were less than $200,000 are less likely to be selected for litigation unless the PRPs are recalcitrant, evidence linking them to the site is good, and the case may be used to create a good precedent or is otherwise meritorious.

For emergency cleanups, cost recovery actions should be referred to the Justice Department as soon as possible after completion of cleanup activities, or for most cases, not later than one year after completion. Referral should occur at the time of initiation of physical on-site construction. EPA should seek to recover costs at all sites where an emergency cleanup was carried out, regardless of whether the site is on the NPL and whether further response action is to be taken.

This strategy sets priorities for EPA Regions in determining the sites at which it should seek the recovery of cleanup costs. The highest priority is placed on recovering costs at all sites where a remedial action has taken place. Next in priority are sites involving expenditures of over $200,000 for emergency cleanups, and where the statutes of limitations presents a problem. The third priority is also placed on sites that involve expenditures of over $200,000 on emergency cleanups, but where the statute of limitations is not a problem. The fourth priority goes to sites were EPA has obtained a partial settlement for less than the full cost of cleanup and where there are financially sound PRPs who did not participate in the settlement. Finally, the lowest priority covers those sites where total cleanup costs are less than $200,000 and the government has a strong case against recalcitrant parties.

The Agency also will attempt to extend cost recovery efforts to cases where cost recovery suits against polluters appear to be prevented by expiration of the statute of limitations. Under SARA section 113(g), the federal government cannot sue a PRP for the recovery of cleanup costs more than three years after the completion of a removal or more than six years after the start of on-site work for remedial action cleanups. EPA interprets the statute of limitations to apply only to cleanups begun after SARA was signed into law on October 17, 1986; the Regions, however, are instructed to refer cases whether or not a cleanup action was initiated before SARA became law.

6.4 Orders Under CERCLA Section 109 for CERCLA Section 103 Violations

The first civil administrative complaint under section 109 of CERCLA for a section 103 violation, and under section 325(b) of the Emergency Planning and Community Right-to-Know Act of 1986 (SARA Title III), was issued by Region I on September 30, 1988. In this case, the Region alleged that All Regions Chemical Lab, Inc., of Springfield, Massachusetts, had violated both section 103 of CERCLA and section 304 of Title III, in its failure to notify the National Response Center of a release, and in its failure to provide a written follow-up notice to the state emergency planning commission and the local emergency planning committee. Region I, therefore, assessed a civil penalty of $25,000 for the section 103 violation, and a penalty of $25,000 for the first day of the Title 304 violation and $500 per day afterwards until the required notice is filed.

Under section 109 of CERCLA, a civil penalty not exceeding $25,000 may be assessed against a generator of a hazardous substance who violates the notification requirements of CERCLA section 103(a) or (b) for the release of a hazardous substance. In addition, for each day such a violation continues, a civil penalty not exceeding $25,000 per day may be assessed against the violator. Action may be also brought in a United States district court to assess a penalty of not more than $25,000 per day for each day the violation, failure, or refusal continues. If there is a second or subsequent violation of the section 103 notification requirements, a penalty not to exceed $75,000 per day may be assessed against the person for each day the violation continues.

6.5 National Enforcement Investigations Center Activities

The National Enforcement Investigations Center (NEIC), located in Denver, Colorado, provided important support to EPA during FY88 in responding to both civil and criminal CERCLA investigations. In the area of technical support for judicial enforcement of Superfund cases, the NEIC was involved in the development of 13 new civil cases and continued to support the development of 26 criminal Superfund cases. Also, within the NEIC's Criminal Investigation Program, 55 investigations were conducted of cases involving some CERCLA activity, and four of these cases involved CERCLA alone.

In addition to providing civil and criminal litigation support for CERCLA investigations, the NEIC also provides support in the area of EPA and state regulatory programs for air, water, toxics, pesticides, radiation, and solid wastes pollution control. The NEIC works in coordination with the Assistant Administrator for Enforcement, the General Counsel, Regional offices, and other EPA Program Directors and their staffs in case preparation in all program areas. To manage EPA's criminal investigations on a national basis, the NEIC maintains an expert staff of criminal investigators, and provides technical training for criminal investigation activities in all regional offices. Also, the NEIC provides guidance and expertise to the Office of Enforcement and Compliance Monitoring (OECM) for the development of enforcement strategies and evidence management, and to Headquarters, EPA Regional offices, and the Department of Justice for the monitoring of technology and remedial programs.

The primary responsibilities of the NEIC include:

- Assuring that scientific and technical evidence is adequate and valid; this includes data collection and analyses and the review and development of analytical techniques, methodologies, and computer information systems;
- Providing services to assist quick response by EPA in emergency situations;
- Applying enforcement strategies in coordination with OECM and the Regional Counsels;
- Providing consultation and assistance in case preparation activities;
- Providing management, training, and other specialized assistance to the Regional offices on criminal investigation; and
- Providing expert testimony on a wide variety of specialized subjects in support of enforcement.

In addition, the NEIC works with staffs of other Assistant Administrators to prepare, assemble, and analyze scientific and technical data. The NEIC also coordinates with staffs of Regional Administrators to provide support and training for federal, state, and local personnel, and works with other government agencies also involved with civil and criminal case preparations. To assist in these efforts, the NEIC produces reports, guidance, and other publications.

7.0 THE EPA PARTNERSHIP WITH STATES AND INDIAN TRIBES

7.1 Overview

CERCLA, as amended, includes provisions for greater state involvement in Superfund response and decision-making activities. SARA emphasizes the CERCLA provisions concerning state involvement by requiring "substantial and meaningful" state involvement in all phases of Superfund response activities. CERCLA extends the opportunity for involvement to Indian tribes, which are to be treated substantively the same as states for most purposes.

7.2 State Involvement Regulations

Section 121(f)(1) of CERCLA requires the President (delegated to EPA in Executive Order 12580) to promulgate regulations providing for the "substantial and meaningful" participation of states in pre-remedial, remedial, and enforcement response activities. In fiscal year 1988, to meet this statutory requirement and to strengthen the EPA/state partnership, the Agency developed Subpart F of the proposed revised NCP. Also, the Agency made progress in developing procedures under section 111(o) to notify state and local governments of limitations on response claims.

7.2.1 State Involvement Under the Proposed Revised National Contingency Plan

The proposed revised NCP was published in the *Federal Register* on December 21, 1988. Proposed Subpart F is completely new and codifies in one place all regulatory requirements for state participation and involvement in Superfund response activities. In general, these proposed revisions to the NCP will broaden the opportunity for state involvement by implementing the SARA requirements and by encouraging state participation in Superfund response activities beyond the minimum statutory requirements.

Proposed Subpart F discusses the roles of EPA and the states in the selection of remedy process. This discussion reflects the evolution of the EPA/State partnership in recent years by assigning the state, when it is the lead agency, responsibilities in remedial process activities that lead to the selection of a remedy. The state as lead agency may recommend the remedy to EPA. This new concept would be applicable to both Fund-financed and non-Fund-financed actions (e.g., enforcement actions).

The concept of a state-recommended remedy is designed to further the EPA/state partnership, optimize the use of governmental resources, and increase the number of response actions. Under the current NCP, EPA has significant involvement in and oversight of activities at state-lead Fund-financed sites. Conversely, EPA has limited involvement at state-lead non-Fund-financed sites. States currently have limited responsibilities during selection of remedy at EPA-lead sites.

CERCLA requires EPA to attain state ARARs that are promulgated and are more stringent than federal ARARs. Proposed Subpart F establishes a process for lead and support agency consultation and for solicitation of their respective identified ARARs and other criteria, guidance, and advisories to be considered that may be helpful in establishing protective cleanup levels. This

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communication/consultation process is ongoing throughout the remedial response process and should ensure that all responses comply with all ARARs and that other criteria, guidance, and advisories are considered, where appropriate. The Agency is currently developing procedural guidance for federal/state interaction on the identification of ARARs.

Proposed section 300.510 of Subpart F codifies the statutory provisions for use of credits to offset a state's required cost-share. CERCLA authorizes credit for state or political subdivision expenditures or obligations for cost-eligible response actions taken at NPL sites from 1978 to 1980. From October 16, 1986 forward, CERCLA section 104(c)(5) limits credit to state expenditures for remedial actions only. EPA and states have reviewed the credit provisions to determine whether state or Trust Fund liabilities existed and found none.

7.2.2 CERCLA Section 111(o) Notification Procedures

Section 111(o) of CERCLA requires the President (EPA by delegation) to develop and implement procedures to adequately notify concerned state and local officials and other concerned persons of the limitations on payment of claims for necessary response costs. EPA published a notice in the *Federal Register* advising the public of the limitations on CERCLA response claims and providing an adequate opportunity for comment before the Agency adopts procedures for notice pursuant to section 111(o) of CERCLA (February 5, 1987). EPA is developing the section 111(o) procedures to notify state and local officials and other concerned persons of the limitations on response claims and procedures for filing claims against the Fund (i.e., CERCLA section 112 procedures) and plans to propose them in 1989.

7.3 Procedures for Involvement of State and Local Governments and Indian Tribes

EPA has promulgated an interim final rule that sets forth the procedures for the involvement in the Superfund program of states, political subdivisions, and Indian tribes (40 CFR Part 35 Subpart O). Subpart O describes requirements for State Superfund Contracts (SSCs) and Cooperative Agreements (CAs) and establishes support agency cooperative agreements (SACA) for funding support agency activities. Support agency activities are activities conducted by a state or federally-recognized Indian tribe pursuant to the NCP to ensure meaningful, substantial involvement when the state is the support agency for a federal or political subdivision lead site, or an Indian tribe is the support agency for a federal-lead site. The SSC, not the SACA, is the vehicle for documenting Section 104 assurances.

7.3.1 Cooperative Agreements with States

Section 104(d)(1) of CERCLA permits EPA to transfer federal funds and to authorize states to undertake CERCLA response activities via a CA. With states, the Agency may enter into CAs that: (1) allow a state to take the lead in response activities at a single site or at several sites in the state; (2) allow EPA and the state to take the lead for different response activities at a site or number of sites in the state; and (3) provide funding for states to assist or support EPA lead response actions.

For state lead Fund-financed remedial actions, the CA is also used by EPA to obtain the required state cost-share (i.e., 10 percent) and other CERCLA section 104 assurances. In federal lead response, EPA leads the response with the state acting in a support agency role. For federal lead Fund-financed remedial actions, EPA uses an SSC to obtain the required state cost-share and other CERCLA section 104 assurances.

7.3.2 Cooperative Agreements with Local Governments

CERCLA permits EPA to enter into CAs with "a ... political subdivision" to carry out any action under the law if the state and the Agency decide that the local government can adequately undertake the action. In accordance with this provision, Subpart F of the proposed revised NCP allows political subdivisions of a state to take the lead for certain response actions via a CA. States are required, however, to be active partners. A state may request that a political subdivision take the lead for a remedial cleanup. In this case, EPA, the state, and the political subdivision are required to establish a three-party SSC that sets forth roles and responsibilities of each party during response actions and is amended to add state section 104 assurances when the remedial action is selected. The SSC must specify the requirements associated with a political subdivision lead, and such Fund-financed actions must comply with CERCLA and the NCP. For remedial actions, the state must underwrite the required section 104 assurances.

Local authorities may be the first to identify a hazardous waste site and bring it to the attention of state and local authorities. They often provide valuable information on the site location (site discovery), details on site history (site investigation), and information on potentially responsible parties.

Currently, there are a number of local governments acting as the lead-agencies for Superfund remedial actions or operable units of actions: Dade and Broward Counties in Florida, South Adams County in Colorado, and Lidgerwood and Wyndmere Townships in North Dakota. EPA will continue to seek local government participation in its efforts to address the hazardous waste issue nationwide. Local governments are playing an increasingly important role in the Superfund program.

7.3.3 Core Program Cooperative Agreements

EPA developed the core program cooperative agreement (CPCA) concept to help ensure that each state has the funds to carry out CERCLA activities. CPCA funds are intended to strengthen, and maintain a state's ability to participate in all aspects of the Superfund program, thus enabling it to take the lead for response actions at more sites and to participate fully in CERCLA implementation activities conducted by the Agency.

The following functions are eligible for funding under a CPCA:

- General program management and supervision to support Superfund activities;

- Superfund program interagency coordination on all phases of response;
- Legal assistance relating to the implementation of CERCLA;
- Development of procedures for fiscal and contract management to support the Superfund program; and
- CERCLA-related clerical and administrative support not directly or indirectly charged to any other site-specific CA.

CPCAs are negotiated with states and are funded annually. Funding requests must be made through the Superfund Comprehensive Accomplishments Plan (SCAP) process. A state is required to contribute at least 5 percent of the cost of the response program support activities covered by the CPCA. CERCLA state credits may not be used to offset a state's cost-sharing obligation for CPCAs since CERCLA authorizes the use of credits for site response only.

OSWER supplemented the *Final Guidance on State Core Program Funding Cooperative Agreements* (December 18, 1987) in August 1988 and promulgated its provisions in an Interim Final Rule (40 CFR 35 Supbart O). A total of 36 states, including Puerto Rico, entered into or were planning to enter into a CPCA in FY88. OERR will evaluate the CPCA mechanism during FY89 and will base future guidance concerning CPCAs on the results of this evaluation.

7.4 Superfund Memoranda of Agreement

CERCLA section 121(f) specifies the minimum statutory requirements for state participation in Superfund response activities. Through the use of EPA/state Superfund Memoranda of Agreement (SMOAs), the Agency encourages state involvement in the Superfund program beyond the minimum statutory requirements. Subpart F of the proposed revised NCP introduces the SMOA as a vehicle for establishing an effective EPA/state working relationship. SMOAs are intended to strengthen EPA/state interaction by specifying in advance how EPA and each state will carry out their respective responsibilities in keeping with the partnership concept.

SMOAs are intended to define and facilitate communications between EPA and a state on all aspects of the response process. A SMOA will define the operating relationship between EPA and a state, as agreed by the EPA Regional office and the state, and as executed by the Regional Administrator and the State Agency Director. A SMOA defines the EPA/state relationship by specifying:

- Interaction during response activities;
- Procedures and timeframes for consultation on planning activities; and
- EPA oversight.

7.5 State Assurance of Capacity

Under section 104(c)(9) of CERCLA, every state either must assure EPA no later than October 17, 1989, that there will be adequate capacity (in or out of state) for the treatment or disposal of all hazardous wastes generated within the state over the next 20 years, or the agency may not provide Superfund monies for remedial actions in the state. During FY88, the Agency, along with the National Governors' Association (NGA), developed draft guidance to assist states in meeting the hazardous waste management capacity assurance requirements of section 104(c)(9). The Agency published this draft guidance in the *Federal Register* on August 31, 1988, and requested public comment.

Four work groups created by NGA under a $1.2 million CA with EPA produced the draft guidance on state assurance of capacity. These work groups consisted of representatives from EPA, state and local government agencies, industry associations, and public interest groups. The draft guidance would require states to prepare a capacity assurance plan (CAP) to comply with the section 104(c)(9) requirements.

The draft guidance is broken into four parts:

- Current state-specific hazardous waste data and projections for the future;
- Allowances for using waste minimization programs to cut hazardous waste volume;
- Plans for developing new treatment capacity; and
- Interstate agreements for treating these wastes.

The Agency and the NGA workgroups reached agreement on the first three parts of the draft guidance, but did not reach a consensus on the interstate agreement component. Consequently, in the published draft guidance, EPA presented and solicited comments on both NGA's final recommendations and on an alternative set of recommendations for the development of interstate agreements regarding waste exports and imports. In general, the states want EPA to assume greater responsibility for resolving differences between states over interstate export and import of wastes, whereas the Agency believes that the states should resolve such conflicts among themselves.

EPA anticipates that the draft guidance on state assurance of capacity will be finalized during 1989.

7.6 Indian Tribes

CERCLA requires EPA to afford to Indian tribes substantially the same treatment as it would to states regarding their involvement in Superfund response activities. Subpart F of the proposed revised NCP does differentiate between states and Indian tribes with respect to CAs. An Indian tribe may be authorized to undertake the lead for Fund-financed response activities or authorized activities as a support agency via a CA or SACA if:

- The Indian tribe is federally recognized;
- The tribal governing body is currently performing governmental functions to promote the health, safety, and welfare of its affected population or environment; and

- The Indian tribe can demonstrate that the functions to be performed are within the scope of its jurisdiction.

7.6.1 Applicability of State Participation Regulations to Indian Tribes

The definition of "state" in Subpart A of the proposed revised NCP includes Indian tribes and, therefore, unless specified otherwise, federally-recognized Indian tribes generally may have the same roles and responsibilities under the NCP as do states.

Proposed Subpart F also provides for Agency interaction with federally-recognized Indian tribes when an NPL site is on Indian lands. For these sites, a separate SMOA may be developed, and in some instances, the SMOA may be a three-party agreement between EPA, a state, and the federally-recognized Indian tribe. Federally-recognized Indian tribes do not have to provide CERCLA section 104(c)(3) assurances (i.e., assurance of future maintenance, cost-share, and availability of a hazardous waste disposal facility).

7.6.2 Cooperative Agreements with Indian Tribes

EPA Region 6 and the Navajo Nation began negotiating a number of CAs and SMOAs in FY88. These agreements include:

- A core program cooperative agreement to support the newly established Navajo Superfund Office;
- A multi-site CA for preliminary assessments and site inspections at 33 sites on Navajo land in New Mexico; and
- A SMOA negotiated with the Navajo Nation and Region 6, along with Regions 8 and 9.

7.6.3 Indian Outreach Program

In response to the CERCLA section 126(c) requirement, EPA submitted to Congress a report entitled *Hazardous Waste on Indian Lands* on November 6, 1987. Among other topics, the report included an assessment of studies on the extent of hazardous waste site problems on Indian lands and a recommendation for the establishment of an education and outreach program concerning the role of Indian tribes in the Superfund program. As part of this education and outreach program, the Agency's Hazardous Site Evaluation Division (HSED) prepared an informational booklet on tribal participation in the Superfund program. This booklet is expected to be widely distributed among Indian tribes in 1989.

The Agency also conducted three Indian Outreach Workshops for Indian Tribes in June and July 1988. These workshops included Headquarters and Regional participation and covered all aspects of the Superfund program, SARA Title III program, the Underground Storage Tank (UST) program, and the Resource Conservation and Recovery Act (RCRA) program, as they relate to Indian tribes. In addition, the Agency offered to run special training courses concerning Superfund for Indian tribes at their request. Indian tribe response has been minimal. EPA has also completed a tribal-lead remedial action at Tar Creek, Oklahoma, and has a SACA in place with the St. Regis Mohawk tribe in New York.

8.0 COMMUNITY RELATIONS AND PUBLIC INFORMATION

In March 1988, EPA issued a new interim version of *Community Relations in Superfund: A Handbook*. The present handbook is a thorough revision of an interim version that EPA issued in September 1986. EPA added new material and rewrote existing material to incorporate new public participation requirements of SARA and EPA policies issued since 1986. The handbook provides policy requirements for coordinating community relations activities at Superfund sites, as well as supplementary techniques that can be used to enhance the effectiveness of the required activities. EPA expects to issue the final version of the handbook upon promulgation of the final NCP. In November 1988, the Agency issued guidance on *Community Relations During Enforcement Activities*. As other Superfund policy and guidance documents are developed and updated, community relations issues and activities will be incorporated.

8.1 Community Relations

Superfund was created to solve a problem that is national in scope but localized in effect. Through its experience with the Superfund program since 1980, EPA has found that its decisionmaking is facilitated when the people in a Superfund site area who are the most concerned about the site or release are involved in the response action. Members of the public who perceive their communities to be endangered feel that their concerns are better addressed when their role in the cleanup process is well defined. EPA, therefore, established the Superfund community relations program as a framework for two-way communication between the members of the local public in the vicinity of a Superfund site and the government agencies responding to hazardous substance releases.

The community relations program has three primary objectives:

- To give the public opportunities to provide input to technical decisions that will affect their communities;
- To inform the public of planned or ongoing response actions; and
- To serve as a forum where alternative viewpoints can be raised and conflict can be resolved.

8.1.1 Community Relations Requirements for Removal Actions

Unlike past versions of the NCP, which explained in a single section the community relations requirements, the proposed revised NCP, in accordance with provisions added by SARA, intersperses the different community relations requirements with the regulations for removal and remedial actions to which they apply.

8.1.1.1 The Community Relations Plan

For all removal actions, the lead agency designates a spokesperson whose function is to inform the community of actions taken, respond to inquiries, and provide the public with information concerning the release. Under the proposed revised NCP, as soon as it appears that a removal action may last longer than 120 days, the spokesperson prepares a formal *community relations plan* (CRP). In past versions of the NCP, the threshold was 45 days. The purpose of the CRP is to state citizen concerns about the site and action, and to list the communications activities that the lead agency expects to undertake during the response action. The CRP is based on interviews of state and local officials, residents, public interest groups, or other interested parties, as appropriate. EPA deliberately chose not to specify in the proposed revised NCP the subjects of the interviews or how the interviews are conducted. Instead, the lead agency, in conjunction with the support agency, determines the number and type of interviews necessary for the development of an accurate picture of the community.

8.1.1.2 The Public Comment Period

For non-time-critical sites and releases (incidents which by their nature allow EPA to plan the removal action for a period of at least six months), EPA announces a minimum 30 calendar day period for public comment on the EE/CA, including an opportunity for public meetings to be held after they have been announced in a major local newspaper and the preparation of responsiveness summaries. The proposed revised NCP also provides for a comment period for those emergency and time-critical sites and releases for which time allows some planning.

8.1.2 Community Relations Requirements for Remedial Actions

When the lead agency has set priorities and evaluated a site for remedial response, community relations efforts become an integral part of the site activities that it undertakes. By adding CERCLA section 117, which contains public participation provisions, Congress directed EPA to ensure that affected communities would be involved from the outset in developing and selecting clean-up actions.

The key provisions of section 117 include the following elements:

- Informing the public of the actions the lead agency intends to undertake by publishing them in the proposed plan, a document that briefly analyzes the remedial action alternatives considered in the feasibility study;
- Making the proposed plan available through the administrative record, which contains documents that form the basis for the selection of a response action, and through publication of a summary of the proposed plan in a major local newspaper;
- Providing the public with a reasonable opportunity to submit written and oral comments on the proposed plan;
- Requiring the lead agency to develop a response to significant comments received on the proposed plan and a discussion of any major changes that are made to the selected remedial alternative;

- Providing the opportunity for public meetings to be held to discuss the proposed plan, for transcripts of formal meetings to be prepared, and for the transcripts to be made available to the public; and
- Explaining significant differences.

The Agency applied these section 117 provisions to each stage of the remedial process in the proposed revised NCP. If the Agency makes a significant change after signing the ROD, it publishes an explanation of the rationale for doing so. The response selection process includes issuing notices, providing opportunities for public comment and meetings, and preparing responsiveness summaries. The proposed revised NCP includes additional avenues for community members to play a role in the remedial design and remedial action phases of the site cleanup.

8.1.3 Technical Assistance Grants Under CERCLA Section 117(e)

Funds were first made available for the Technical Assistance Grant (TAG) Program in fiscal 1988, and EPA awarded grants to four citizens' groups (see Exhibit 8.1-1).

8.1.3.1 Purpose of the Technical Assistance Grant Program

The TAG Program is designed to provide funds to communities to seek the assistance of independent advisors who interpret technical information related to cleanups at Superfund sites. The advisors provide affected communities with a better understanding of the process of cleaning up a site, the nature of site conditions and wastes, and the alternative solutions. Ultimately, the TAG program allows communities to be well-informed about Superfund and provides EPA and the states with informed comments from citizens living near hazardous waste sites.

The Agency can provide groups of individuals with TAGs of up to $50,000 per site. In accordance with the Interim Final Rule, the Agency issues only one grant to an eligible site, and the community contributes 35 percent of the total costs of the TAG project. EPA grants waivers of this matching fund requirement only in exceptional circumstances. Applicants may request grants at any time after a site is proposed for or listed on the NPL, or proposed for inclusion on the NPL and where a response action is underway. Any group of individuals that may be affected by a release or a threatened release at any of these facilities is eligible to receive a TAG. Potentially responsible parties and other groups and organizations are not eligible to receive grants.

EPA published an Interim Final Rule (IFR) regarding the TAG Program on March 24, 1988. From the time of publication of the IFR to the end of fiscal 1988, the EPA Regional offices received 80 letters expressing intent to apply for TAGs and 13 draft or final grant applications. The IFR allowed the Agency to begin accepting applications from citizens groups and awarding grants without further delay, while simultaneously accepting comments on and developing the final rule. The TAG workgroup met in October 1988 to begin deliberations on the final rule, and the Agency plans to publish it in 1990.

Exhibit 8.1-1

Communities Receiving Technical Assistance Grants in Fiscal 1988

Region	Site Name and Location	Grant Recipient	Grant Amount
2	Love Canal Niagara Falls, New York	Love Canal Environmental Action Committee	$43,067
2	Fulton Terminals Fulton, New York	Fulton Terminals Safe Drinking Water Action Committee	$50,000
3	Lackawanna Refuse Old Forge Borough, Pennsylvania	Old Forge Toxic Waste Removal Committee	$50,000
5	Industrial Excess Landfill, Uniontown, Ohio	Concerned Citizens of Lake Township, Inc.	$50,000

SOURCE: OSWER Annual Report: Fiscal Year 1988, OSWER, November 1988.

8.1.3.2 Guidance on Technical Assistance Grants

The Agency issued the following TAG guidance documents:

- A final guidance, *Technical Assistance Grants Program Activities Prior to Issuance of the Interim Final Rule*, in January 1988;
- An interim final *Citizens' Guidance Manual for the Technical Assistance Grant Program* in June 1988;
- A final *Regional Guidance Manual for the Technical Assistance Grant Program* in July 1988; and
- A final *Guidance on Technical Assistance Grants for Public Participation* in October 1988.

EPA also issued fact sheets on various aspects of the program and conducted workshops for the public.

8.2 Public Information

EPA has developed a number of sources to which members of the public can turn to obtain information about a particular Superfund site, about the Superfund program in general, or about Superfund regulatory developments. In addition, the Agency has established mechanisms for members of the public to voice complaints about Superfund actions.

8.2.1 Resource Conservation and Recovery Act/Superfund Hotline

The RCRA/Superfund Hotline generally receives about 250,000 calls per year, including requests for information and document requests. The number of inquiries has been steadily increasing each year, and was particularly large in the third and fourth quarters of FY88. The increased use is most probably because of increased levels of RCRA, Superfund, SARA, and Underground Storage Tank regulatory activity, greater awareness of Hotline services, and expanded hours of operation. The Hotline handled questions about SARA Title III for the first time during FY88; in the past, the Hotline staff referred callers concerned with SARA Title III to the appropriate state or Regional Coordinator. The Agency installed a telecommunications device for the deaf (TDD) in FY89 to make the Hotline accessible to hearing-impaired persons.

The Hotline is EPA's primary public information service for questions related to the interpretation of RCRA, CERCLA, SARA, HSWA, and relevant regulations, as well as about the environment in general. The Hotline also serves as a liaison between the regulated community and EPA personnel. It is staffed by information specialists, whose backgrounds include engineering, biology, chemistry, geology, industrial hygiene, environmental science, and environmental policy. If an information specialist cannot answer an inquiry directly through the Hotline's resources, a specialist refers the issue to the appropriate EPA office (e.g., the Office of General Counsel) and reports the information to the caller. The information specialists also take requests for publications.

8.2.2 Superfund Docket and Information Center

The Superfund Docket and Information Center (SDIC) received a total of 3,232 document requests during the fiscal year. Of this total, 245 were requests for Records of Decision (RODs), 805 were requests for guidance documents, and 2,182 were requests for rulemaking docket documents. These figures do not reflect referrals or assistance of misdirected phone calls, which are estimated to total about 7,000 calls per year in addition to those included in official docket operations figures.

The public docket is the document records center for rulemaking actions and regulatory decisions made under CERCLA. The docket also includes information supporting rulemakings under section 3012 of the Resource Conservation and Recovery Act (RCRA). EPA established the docket shortly after the enactment of CERCLA. The function of the docket is to provide interested parties with access to regulatory support materials for proposed and final rules. In addition to serving the public right of access by making SARA Title III documents available, the docket supports internal staff and management information needs.

Docket staff can distribute the following materials:

- Background data;
- Guidance documents;
- Public comments on regulatory actions;
- *Federal Register* notices;
- Transcripts of public hearings;
- Support documents for regulatory decisions;
- Correspondence;
- Administrative records;
- Operating directives;
- RODs; and
- Signed decision documents.

The staff also prepares responses to Freedom of Information Act (FOIA) requests. Rulemaking records that have had prior Office of General Counsel (OGC) approval are available to the public for viewing at the docket office. The public is allowed access to docket materials upon announcement of a rulemaking in the *Federal Register*. No access is granted prior to the announcement because (1) the *Federal Register* notice needs to be included in the docket index as part of the Agency's rulemaking rationale, and without it the index would be incomplete, and (2) visitors would have an unfair advantage over the general public who rely on the *Federal Register* for notice of rulemaking.

8.2.3 Public Information Center

EPA's Public Information Center (PIC) received a total of 4,515 inquiries about the Superfund program during the fiscal year, including 4,481 requests from adults and 34 requests from children. About one half of these calls were referred to other information mechanisms, with the majority referred to the Superfund Hotline.

The Center distributes a wide variety of general, non-technical information to the public. EPA publications on all major environmental topics, including Superfund, are available through the Center. The Center also acts as a referral source. When the public expresses an interest in a topic on which there are no publications, the Center informs the appropriate EPA program office, so that the program office can develop response materials. The PIC maintains about 50 different Superfund program publications on-site and additional non-technical publications at its Cincinnati storehouse.

8.2.4 Hazardous Waste Ombudsman Program

Since EPA established the Hazardous Waste Ombudsman Program, the Ombudsman Offices have received over 2,000 calls. The Headquarters Ombudsman Office tends to receive calls about problems that are more general in scope, while the Regional offices tend to receive calls that address specific sites or problems. All calls are held in confidence, to the extent that the law allows. The program has assisted dozens of environmental groups, worked with neighborhood organizations, and trained Regional representatives to serve as local ombudsmen. The offices have conducted several investigations of EPA's implementation of regulations. An evaluation of the Ombudsman Program is currently underway.

EPA's Ombudsman Offices investigate questions and complaints about government officials or administrative actions and seek to correct problems, where warranted. An ombudsman is an impartial, independent, and informal source of information for the public. The purpose of the Ombudsman Offices that have been established at EPA Headquarters and each Regional office is to assist private citizens and members of the regulated community who have been unable to resolve hazardous waste issues through normal channels. The program is not intended to circumvent existing channels of management authority, nor is it intended to establish alternative avenues of appeal. The program is a supplement to existing institutions, not a replacement for them.

The Ombudsman Offices lack the legal authority to reverse or modify any program actions or decisions. Based on sound information gained through contact with the public, however, the Ombudsman Offices may influence Superfund program adjustments.

9.0 EPA SUPERFUND PROGRAM ADMINISTRATION

This chapter documents and describes the accomplishments achieved by the Agency in the administration of the Superfund program during fiscal 1988. The first section presents data on the allocation and utilization of resources by EPA in the implementation of the Superfund program. The second section describes the Superfund contracts awarded during the fiscal year. In FY88, the Agency diversified its Superfund contracting procedures and delegated increased contract management responsibility to the Regional offices in order to better meet the needs of the removal and remedial programs and to expedite the completion of cleanups.

The third section of the chapter describes the activities undertaken by EPA concerning Superfund training programs, including the presentation of numerous worker health and safety training courses and the development and publication of a number of training documents. The Agency's Superfund management and information systems are described in section four. The last section details Agency activities regarding the development of Superfund rulemakings, many of which are mandated by the new SARA provisions. These rulemakings include: the proposed revised National Contingency Plan, rules concerning CERCLA reporting requirements, and a rule concerning the indemnification of response action contractors.

9.1 Fiscal 1988 Superfund Resource Utilization

9.1.1 Overview

This section presents data and information on the utilization of resources from the Hazardous Substance Trust Fund for Superfund implementation activities by EPA and other Executive branch departments and agencies in FY88. The data and information included in this section were obtained primarily from EPA Superfund budget documents. Superfund resource requirements of EPA and other Executive branch departments and agencies for fiscal 1989-1991 and beyond FY91 are discussed in Chapter 14.

EPA uses Superfund resources in four major areas:

- Hazardous Substance Response;
- Enforcement;
- Management and Support; and
- Research and Development.

Both EPA Headquarters and the Regional offices perform these Superfund activities. Regional activities are funded by monies transferred to the Regions. Fiscal year and historical transfers to Regional offices are shown in Exhibits 9.1-1 and 9.1-2. In addition, EPA transfers resources to other federal departments and agencies to assist them in meeting their responsibilities under CERCLA. The Agency also transfers funds from the Superfund appropriation to state governments and other private sector organizations (e.g., the National Governors Association) to assist EPA in the implementation of CERCLA.

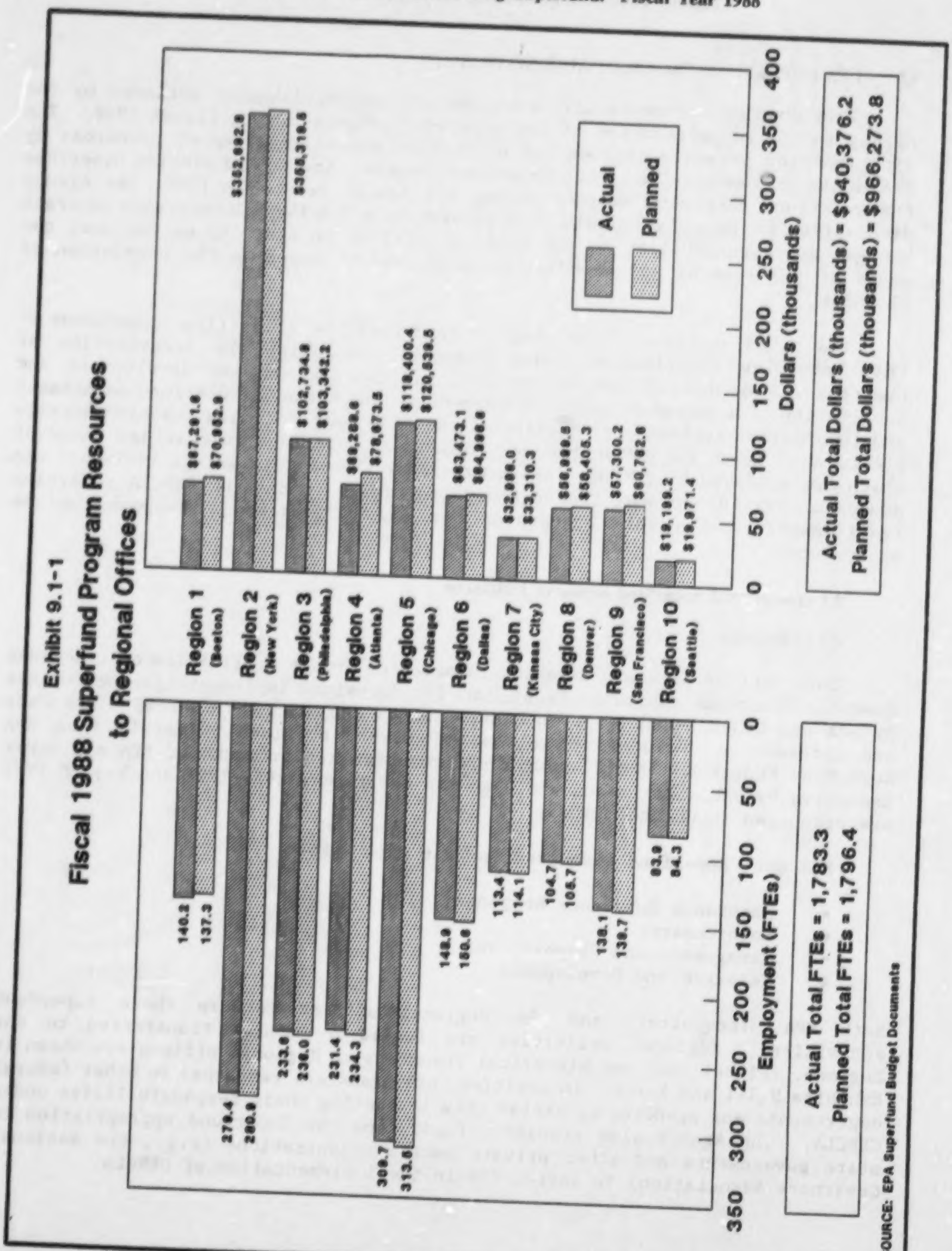


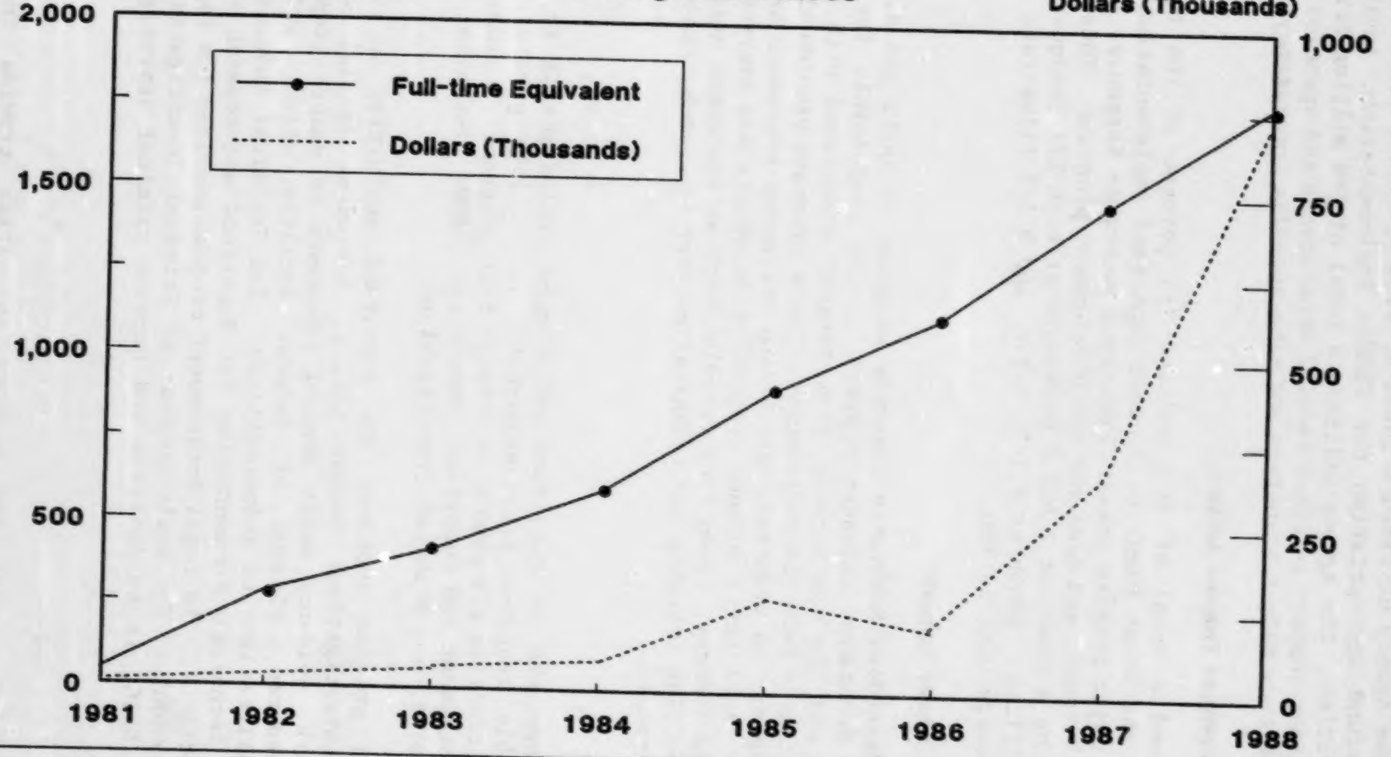
Exhibit 9.1-1

Fiscal 1988 Superfund Program Resources to Regional Offices

SOURCE: EPA Superfund Budget Documents

Exhibit 9.1-2

Historical Superfund Program Resources to Regional Offices



	1981	1982	1983	1984	1985	1986	1987	1988
FTEs	44.9	289.4	421.0	602.0	904.3	1,125.5	1,476.5	1,783.3
Dollars	$2,362.4	$11,801.4	$29,222.1	$42,953.4	$267,485.9	$173,596.6	$562,312.6	$940,376.2

NOTE: Dollar amounts are funds obligated as of September 30 of the fiscal year; they include funds appropriated in each fiscal year and funds carried over from previous fiscal year appropriations.

SOURCE: EPA Superfund Budget Documents

In FY88, the Agency utilized a total of $1,497,370,300 from the Hazardous Substance Superfund appropriation for CERCLA implementation, including SARA Title III activities. The Agency utilized a total of $98 million for Superfund general interagency support to other federal departments and agencies, including Superfund Interagency Budget transfers and site-specific interagency agreements.

9.1.2 EPA Superfund Program Activities

EPA utilized a total of $1.4 billion (93 percent of the total amount obligated from the Trust Fund) to conduct Superfund implementation activities under the four major program areas: Hazardous Substance Response, Enforcement, Management and Support, and Research and Development programs. These activities were supported by a total of 2,642.2 workyears at both EPA Headquarters and in the Regional offices. Exhibits 9.1-3, 9.1-4, and 9.1-5 illustrate current and historical resource utilization.

Hazardous Substance Response

The two Hazardous Substance Response programs -- Spill and Site Response and Hazardous Substance Response Support -- are responsible for protecting public health and the environment from dangers associated with releases of hazardous substances into the environment. These programs provide the necessary funding and support to undertake short-term emergency responses and long-term site cleanups. Activities include responding to spills and emergency releases of hazardous substances, conducting remedial work at abandoned hazardous waste sites, and providing training and technical support to Agency, state, and local government personnel.

Enforcement

The primary goal of Superfund enforcement activities is to achieve the maximum possible response from potentially responsible parties. Superfund enforcement activities are conducted through four programs: Technical Support - Office of Enforcement and Compliance Monitoring (OECM), Technical Enforcement, Legal Enforcement, and Criminal Investigations.

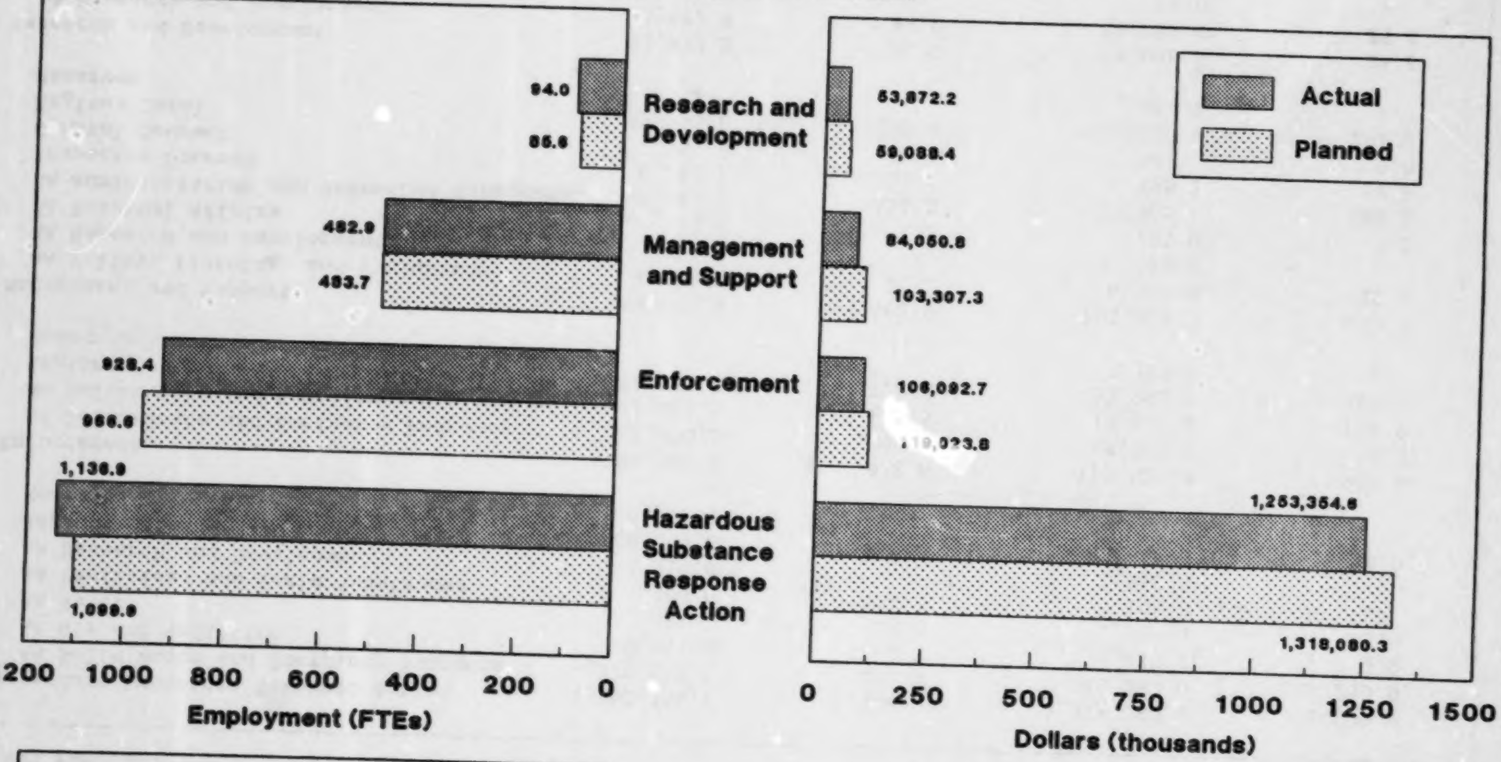
The OECM program supports the Superfund activities of the National Enforcement Investigations Center (NEIC), including special environmental monitoring work, evidence audit control processes to ensure proper chain-of-custody procedures, cleanup of federal facility sites, and nonbinding preliminary allocations of responsibility. The Technical Enforcement program develops the technical documentation for Superfund enforcement and initiates enforcement actions. The Legal Enforcement program provides the legal staff for CERCLA enforcement. The basic purpose of Criminal Investigation, under the direction of NEIC, is to initiate and conduct criminal investigations under CERCLA.

Management and Support

Superfund management and support activities provide the financial, administrative, and support services necessary to manage and implement the Superfund program. This includes financial management to track and report on the use of the Hazardous Substance Superfund; administrative management of

Exhibit 9.1-3

Superfund Fiscal 1988 Resources by Program Function



Actual Total FTEs = 2,642.2
Planned Total FTEs = 2,635.8

Actual Total Dollars (thousands) = $1,497,370.3
Planned Total Dollars (thousands) = $1,599,499.8*

* EPA had originally intended to use approximately $100 million in carryover funds from FY87.

NOTE: Totals include resources used for interagency support and SARA Title III activities.

SOURCE: EPA Superfund Budget Documents.

Exhibit 9.1-4

Fiscal 1988 Superfund Resources by EPA Office and Function

EPA Office and Function	Actual		Planned	
	Dollars (in thousands)	Full-Time Equivalents	Dollars (in thousands)	Full-Time Equivalents
Hazardous Substance Response Action	1,253,354.6	1,136.9	1,318,080.3	1,099.9
AA Solid Waste and Emergency Response	330,941.1	261.8	349,887.0	253.9
AA Air and Radiation	2,047.8	8.1	2,117.6	5.0
AA Water	991.7	3.0	1,010.4	3.0
AA Pesticides and Toxic Substances	105.0	--	105.0	--
AA Research and Development	3,210.0	--	3,210.0	--
Regions Total	866,009.6	864.0	886,450.4	838.0
Reserves	49,707.7	--	74,949.9	--
Enforcement	106,092.7	928.4	119,023.8	966.6
AA Solid Waste and Emergency Response	41,500.5	99.2	48,358.2	94.3
AA Enforcement and Compliance Monitoring	13,159.5	102.5	13,623.2	104.9
Regions Total	51,432.8	726.7	53,292.7	767.4
Reserves	--	--	3,749.7	--
Management and Support	84,050.8	482.9	103,307.3	483.7
AA Policy, Planning, and Evaluation	4,315.5	11.7	4,319.0	12.8
AA Research and Development	215.9	--	250.0	--
AA External Affairs	111.6	1.8	205.0	3.0
AA Administration and Resources Management	42,322.3	214.2	53,835.6	215.1
Inspector General	6,285.1	52.6	6,896.1	52.8
General Counsel	866.6	10.0	867.7	9.0
Regions Total	22,933.8	192.6	26,530.7	191.0
Reserves	--	--	403.2	--
Research and Development	53,872.2	94.0	59,088.4	85.6
AA Research and Development	53,872.2	94.0	59,088.4	85.6
Reserves	--	--	10.0	--
Superfund Total[1]	$1,497,370.3	2,642.2	1,599,499.8[2]	2,635.8

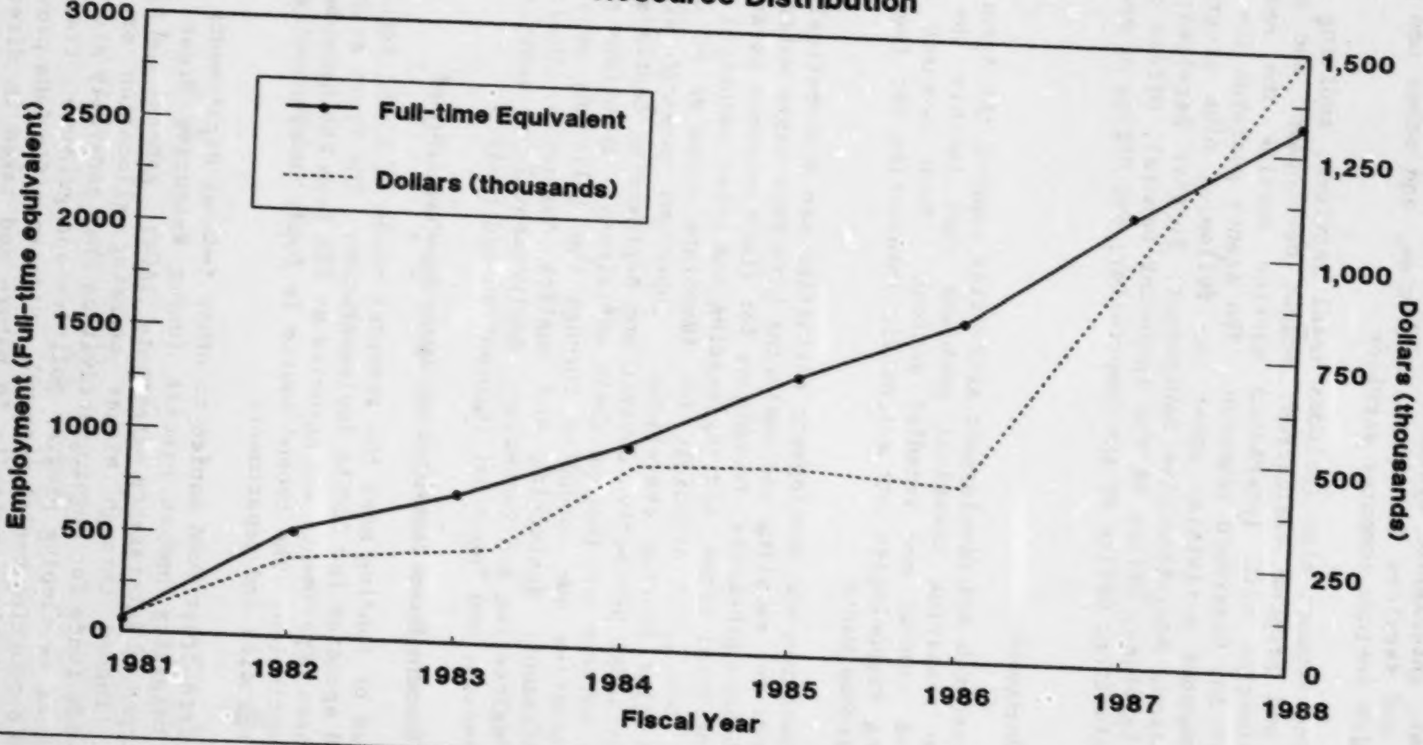
[1] Includes resources utilized for interagency support and SARA Title III activities.

[2] EPA had originally intended to use approximately $100 million in carryover funds from FY87.

SOURCES: EPA Superfund Budget Documents.

Exhibit 9.1-5

Historical Superfund Program Resource Distribution



FTEs	75.3	527.7	724.8	996.3	1,350.3	1,642.8	2,174.3	2,642.2
Dollars	$40,283.1	$180,743.6	$230,233.4	$465,619.4	$483,116.0	$406,268.8	$1,050,748.9	$1,497,370.3

NOTE: Dollar amounts are funds obligated as of September 30 of the fiscal year; they include funds appropriated in each fiscal year and funds carried over from previous fiscal year appropriations.

SOURCE: EPA Superfund Budget Documents

contract, personnel, information systems, office and laboratory services, and safety training; and services for space, utilities, and other non-personnel support needs, which include computer services.

Management and support also includes legal services, auditing services, policy analysis and program evaluation, budget development and oversight, effective communication with interested parties outside the Agency, and laboratory support for Superfund research. The Agency performs its Superfund management and support activities under the following nine program areas: Financial Management; Administrative Management; Support Services; Computer Services; Legal Services; Office of the Inspector General; Office of Policy, Planning, and Evaluation; Office of the Comptroller; and Office of Research and Development.

Research and Development

Superfund research and development activities support the Agency, states, and industry in resolving technical problems that inhibit the effective implementation of removal and remedial actions. Much research focuses on adapting existing technologies and scientific information for the purpose of controlling hazardous waste.

Superfund research and development activities are systematically designed to provide methods for sampling and analyzing hazardous waste materials needed for quality assurance protocols; techniques for field response personnel to use in evaluating potential sites; and engineering and other technical guidance to federal, state, and local officials for immediate response at uncontrolled hazardous waste site cleanup operations. Superfund research also includes evaluation of personal protective devices and engineering controls to protect hazardous waste workers and improve their efficiency. Superfund research and development activities are conducted through the following seven programs: Scientific Assessment; Monitoring and Quality Assurance; Health Effects; Environmental Engineering and Technology; Environmental Processes and Effects; Exploratory Research; and Technical Information and Liaison.

9.1.3 Other Executive Branch Department and Agency Superfund Activities

Two sources of funding meet the resource needs of other Executive branch departments and agencies for CERCLA implementation. The first source is monies obligated to these departments and agencies by EPA from the Hazardous Substance Superfund appropriation. The second source is funds independently budgeted by other federal agencies and departments.

EPA transfers Trust Fund monies to other federal departments and agencies through an interagency budget process (under Executive Order 12580) which utilizes two types of interagency agreements (IAGs): general and site-specific. General IAGs, funded through either transfer allocation or reimbursable accounts, provide funds for ongoing activities that generally are not incident-specific, such as developing program policies and guidance, training response personnel, and conducting health research. Site-specific IAGs provide funds for those activities that are episodic in nature and taken in direct support of specific site or spill response actions. Site-specific activities are generally paid for on a reimbursable basis.

The second source of funding used to meet other federal department and agency Superfund resource needs is monies that are independently budgeted by individual departments or agencies for Superfund activities and support as part of the President's annual budget submission. This source of funding for Superfund activities is discussed in Chapter 14.

For FY88, EPA transferred a total of $98,023,300 from the Hazardous Substance Superfund appropriation to other federal departments and agencies. Exhibit 9.1-6 presents data on the FY88 Superfund interagency agreements by department and agency.

Department of the Interior

The NCP also designates the Department of the Interior (DOI) as federal Trustee for certain natural resources either lost or damaged due to hazardous substance releases. DOI provides scientific and technical support in resource damage assessments through its participation on the National and Regional Response Teams.

Department of Transportation

The United States Coast Guard (USCG) is a part of the Department of Transportation (DOT), except when operating under the Department of the Navy in time of war. The USCG is the predesignated On-Scene Coordinator in the Coastal Zone, and has the authority under CERCLA to respond to any release or threatened release of hazardous substances involving the Coastal Zone, Great Lakes waters, ports, and harbors. The USCG and EPA share responsibility for the emergency response activities under the NCP. The USCG provides training to maintain this response capability, conducts enforcement activities as necessary in its areas of responsibility, maintains the National Response Center (NRC), and supports the National Response Team and each of the Regional Response Teams. In addition, the USCG (under section 108(a) of CERCLA) enforces the requirements that commercial vessels using U.S. waters must provide evidence of financial responsibility to pay for cleanup in the event of spills.

Department of Health and Human Services

Within the Department of Health and Human Services (HHS), the Agency for Toxic Substances and Disease Registry (ATSDR) and the National Institute for Environmental Health Sciences (NIEHS) have certain Superfund responsibilities. ATSDR can investigate complaints of illness or disease related to exposure to hazardous substances, conduct health studies and surveys, develop testing for exposed individuals, and develop and maintain information on the health effects of toxic substances. Under CERCLA section 104, ATSDR is required to perform health assessments by December 10, 1988, at all sites that were listed on the NPL as of October 17, 1986, and on all newly proposed sites within one year of the date of proposal. HHS develops policies and procedures to ensure a coordinated federal approach in conducting the above activities. NIEHS administers a training grant program in worker protection and a program for basic research, development, and training to promote better understanding of the effect on human health of exposure to hazardous substances.

Exhibit 9.1-6

Fiscal 1988 Superfund Interagency Support Resources

Federal Department or Agency	Dollars (in thousands) Actual	Dollars (in thousands) Planned
Department of the Interior	$ 1,113.5	$ 1,253.5
Department of Transportation	3,027.6	4,948.2
Department of Health and Human Services	42,999.9	43,000.0
Department of Commerce	2,429.4	2,280.1
Department of Justice	16,373.0	16,373.0
Department of Labor	380.9	1,008.2
Federal Emergency Management Agency	2,784.0	6,092.6
TOTAL	$69,108.3	$74,955.6

SOURCES: EPA Superfund Budget Documents.

Department of Commerce

The National Contingency Plan designates the National Oceanographic and Atmospheric Administration (NOAA) to act on behalf of the Secretary of Commerce as Federal Trustee for natural resources in coastal and marine areas that are lost or damaged due to hazardous substance releases. NOAA also provides scientific and technical support for responses to such releases in coastal and marine waters.

Department of Justice

The Department of Justice (DOJ) is responsible for the conduct and control of all litigation under CERCLA. EPA is responsible for preparing the required technical and legal documentation, and cooperates with DOJ in negotiating consent decrees for privately financed response actions. With the transfer funds it received from EPA, DOJ provided civil and criminal enforcement litigation, including counseling on and enforcement of administrative orders and warrants for entry, and institution of suits to compel removal and remedial actions and to recover Superfund response costs.

Department of Labor

The Occupational Health and Safety Administration (OSHA) of the Department of Labor is responsible for worker protection at Superfund sites. The OSHA Health Response Team assists EPA and other on-site personnel in protecting workers at Superfund sites and in developing guidelines to improve current methods of worker protection. OSHA utilized transfer funds to provide technical assistance to EPA, initiate a special program for worker safety at Superfund sites, support National and Regional Response Teams, and develop a required worker protection standard.

Federal Emergency Management Agency

The Federal Emergency Management Agency's (FEMA) hazardous materials (HAZMAT) program involves working with federal, state, and local governments and the private sector to provide guidance, deliver technical assistance, facilitate information sharing, and promote interagency/intergovernmental coordination in the areas of emergency preparedness, response, and mitigation. The overall goal of FEMA's HAZMAT program is to reduce the frequency and severity of hazardous material emergencies by enhancing the prevention and response capabilities of federal, state, and local agencies, as well as of the private sector. Much of FEMA's HAZMAT program is accomplished through the National Response Team and the Regional Response Teams. In the event of an emergency, FEMA assists in the temporary or permanent relocation of individuals whose health is threatened by the release of hazardous materials.

9.2 Superfund Contracting

9.2.1 Overview

EPA manages contracts in five major categories to implement the Superfund program:

- *Headquarters/Regional policy implementation analysis and support*: Eight contracts, with a potential value of $86,276,167, supported Headquarters and Regional management, analytical, and technical development and implementation programs. Under these contracts, contractors provided both technical and non-technical assistance.
- *Contract laboratory services*: One hundred seventy-two contract laboratory services contracts, with a potential value of $211,875,557, were active in FY88 (these figures do not include subcontracts for special analytical services). The Contract Laboratory Program (CLP) provides laboratory support for both removal and remedial actions. The greatest number of Superfund contracts fall into this category.
- *Removal action support*: Fourteen contracts, with a potential value of $899,767,335, supported the removal program. Removal program contracts provide EPA with support

services in emergency response, other removal actions, spill prevention, and analytical services.

- *Remedial action support*: Thirty-seven remedial action contracts provided EPA technical assistance during RI/FS, remedial design, and construction stages of response. These contracts have a potential value of $3,640,675,544.
- *Enforcement support*: Five enforcement contracts assisted EPA in cost recovery and litigation support operations. Combined they have a potential value of $135,444,683.

Exhibit 9.2-1 lists FY88 contract awards and their potential value.

9.2.2 Contract Laboratory Program

Prior to the Superfund program, there were few firms with experience in addressing hazardous waste site problems. The capacity to conduct the work involved in a program of this size was simply unavailable in the private sector. Because the Superfund program had to rely on contractors, the program could not progress until qualified firms expanded their staffs, developed operating and management procedures for contracts of such magnitude and complexity, and acquired the appropriate scientific and engineering expertise. Laboratory capacity was a critical problem. Samples from the rapidly expanding Superfund investigations caused an almost exponential growth in required analyses, resulting in a national laboratory capacity shortage. The shortage exacerbated the delays in investigations for remedial actions.

EPA's Contract Laboratory Program has worked with increasing success to build up the nation's laboratory capacity. The program has also worked to ensure that the quality control and chain-of-custody procedures required to yield analyses that will hold up in court are in place. The CLP was established in 1980 to provide large volume, low-cost analyses, and today provides laboratory services for removal, pre-remedial, and remedial actions. Depending on capacity needs, the Agency awards multi-year contracts for organic, inorganic, and dioxin analytical services.

In fiscal 1988, 121 laboratories had CLP contracts in place. Fifty-eight contracts were awarded during the fiscal year. At the end of FY88, CLP capacity was measured at 236,550 samples: the total number of samples that the Agency could schedule active laboratories to analyze during a calendar month. All of these figures represent not only increases over the CLP's FY87 performance, but also the highest levels of performance recorded to date for the Superfund program.

During the fiscal year, the CLP was able to meet Regional demand for analytical services. The CLP performed a total of 77,729 routine analytical services (RASs) and 43,315 special analytical services (SASs). RASs are contracts which specify the procedures a particular laboratory will follow, while SASs are contracts which include unique sampling work (e.g., a quick turn-around analysis). Both of these figures represent annual highs for analytical services performed by the CLP. Total expenditures by the CLP for these services in FY88 were $33,702,502 for RASs and $12,029,164 for SASs. Exhibit 9.2-2

Exhibit 9.2-1

Fiscal 1988 Contract Awards

Contract	Number of Contracts	Total Potential Value ($)
General Policy and Technical Support	5	32,869,366
Response Support:		
Laboratory	58	58,559,472
Removal	7	152,118,150
Remedial (ARCs)	18	2,672,608,008
Enforcement Support	3	2,444,683

NOTE: Figures represent the total potential value over the life of the contract.

SOURCE: Active Superfund Contracts Listing, FY 1988-1989, EPA Office of Administration.

provides a breakdown of these numbers by the type of analytical service performed.

Presently, the average time for delivery of analytical results is 35-40 days, a duration well within EPA's stated target. Continuing efforts to increase CLP automation may reduce the delivery time in the near future. EPA determined that a reduction in the time necessary to screen CLP data for contract compliance and to process analyses would save resources. In the past, all CLP data were either reviewed manually or were manually entered into a computer for screening. An automated approach was designed to address this problem. By March 31, 1988, contracts were in place to provide for automated data transmission, thereby significantly reducing human transcription errors and reducing overall data review costs.

Overall, the management of analytical services has improved and streamlined the cleanup process. The CLP maintains three data bases on Superfund analyses. Each data base serves a unique purpose, allowing the CLP to monitor analytical activities over the course of the Superfund program. In addition, the CLP integrates these data bases into four data support systems that ensure that the program controls the quality of work performed. Exhibit 9.2-3 describes these CLP data bases and data support systems.

Exhibit 9.2-2

Contract Laboratory Program Superfund Analytical Services for Fiscal 1988

	Number of Samples (Percentage of Total)	Expenditures (Percentage of Total)
ROUTINE ANALYTICAL SERVICES:		
Organic	34,191 (44%)	$27,478,849 (82%)
Inorganic	37,563 (48%)	5,289,411 (16%)
Dioxin	5,975 (8%)	934,242 (3%)
TOTAL	77,729 (100%)	$33,702,502 (101%)
SPECIAL ANALYTICAL SERVICES:		
Organic	16,024 (37%)	$ 5,766,974 (48%)
Inorganic	23,582 (54%)	3,785,331 (31%)
Dioxin	1,982 (5%)	1,870,387 (16%)
Other	1,727 (4%)	606,472 (5%)
TOTAL	43,315 (100%)	$12,029,164 (100%)

NOTE: Percentages may not total 100% because of rounding. Totals do not include samples taken for RCRA activities, which the CLP also supports.

SOURCE: EPA Contract Laboratory Program, Sample Management Office.

As more Superfund sites move from the SI stage to the RI/FS, RD, and RA stages, the CLP's capabilities must change. In particular, the CLP must have the capability to analyze samples with lower concentration levels of contaminants. The Agency held several meetings during the fiscal year with Regional and CLP staff to develop contracts for analyzing lower detection limits and to ensure that contamination introduced by the laboratories themselves is minimized.

Environmental Services Assistance Team Contracts

Due to significant increases over the past few years in the need for Regional support on environmental services, EPA awarded two contracts in support of the laboratory program at the end of FY87. These two Environmental Services Assistance Team (ESAT) contracts are worth $35 million each and provide assistance to EPA's Regional offices in laboratory, analytical, and review services. The two ESAT contracts cover different geographical zones (the eastern zone includes Regions 1-4 and the western zone includes Regions 5-10 and Headquarters) and both are essentially fully operational at this time.

Exhibit 9.2-3

Contract Laboratory Program
Analytical Data Bases and Data Support Systems

Name	Date Initiated	Purpose
DATA BASES:		
Superfund Statistical Results Data Base	1980	To estimate the occurrence and concentration of compounds at NPL and non-NPL sites.
Contract Compliance Screen Data Base	1985	To evaluate laboratory methods and performance.
Superfund Analytical Results and Quality Assurance Data Base	1987	To provide analytical results and quality assurance information to data users.
DATA SUPPORT SYSTEMS:		
Automated Data Review (ADROIT)	1982	To provide quality assurance data for selected samples.
Statistical Results Data Base (STAT)	1984	To provide analytical results of samples.
Contract Compliance Screening (CCS)	1985	To provide quality control compliance data.
CLP Analytical Results Data Base (CARD)	1987	To provide summaries of analytical results and quality control compliance.

SOURCE: EPA Contract Laboratory Program, Sample Management Office.

The initial staffing of the two ESAT contracts provides 92 workyears to the Regions and 10 workyears to zone management offices and a Headquarters technical team, with a provision for significant increases in support through the exercise of options. The most notable contribution of the ESAT teams to date has been in data review. Regions 4 and 5 are now current on reviewing CLP data packages after years of significant backlogs. Also, indemnification clauses were recently placed in the ESAT contracts by formal modification. The modifications will permit ESAT personnel to go on-site to perform quality assurance oversight of sampling and field analysis activities. Several teams in the western zone are presently staffed over ceiling, using hours not utilized during mobilization, in support of Regional requests for additional work and resources.

During the fiscal year, the Agency formed workgroups to address data useability and continues to develop quick-reference charts for articulating quality control responsibilities. The Agency's Hazardous Site Evaluation Division conducted on-site audits, data audits, and quarterly performance evaluations at all CLP facilities. All contracts managed by HSED's Analytical Operations Branch (AOB) were transferred to EPA's Contract Management Division in Research Triangle Park, North Carolina. The AOB continues to identify the Regions' anticipated needs for new types of analytical services and to track the quality of analytical methods employed.

9.2.3 Response Support Contracts

Removal Support Contracts

The removal program has traditionally been supported by Emergency Response Cleanup Services (ERCS) contracts. Under the ERCS contracts, contractors perform removal actions on a zone basis: Zone I consists of Regions 1-3; Zone II consists of Region 4; Zone III consists of Region 5; and Zone IV consists of Regions 6-10. EPA has announced its intent to break up zone IV into two separate ERCS contracts, and has issued a Request for Proposal (RFPs) for these contracts.

The ERCS contracts for Zones I, II, and IV were awarded in FY87 for one base year and three option years. In June 1988, the Agency exercised the first option year for the Zone I and II contracts. The first option year of the Zone IV contract was exercised in February 1988. The Zone III ERCS contract was awarded in October 1987 for one base year and three option years, and the first option year was exercised in September 1988.

In addition, EPA developed and began implementation of a strategy for awarding smaller removal contracts on a Regional basis, i.e., "mini-ERCS." In FY88, mini-ERCS contracts were awarded in Regions 2, 3, and 4. The awards included small business contracts in Regions 2 and 3. In FY87, four mini-ERCS contracts for dioxin excavation and storage work in Region 7 were signed for one base year and four option years each. The Agency exercised the first option year of each of these contracts in FY88.

The removal program is also supported by Technical Assistance Team (TAT) contracts, which serve as adjuncts to the ERCS contracts and provide for initial site response support, determinations of the size and nature of the site, and support for On-Scene Coordinators during actual cleanup. The TAT contracts are performed on a zone basis. The eastern zone covers Regions 1-5, the Emergency Response Team, and Headquarters, and the western zone covers Regions 6-10. These contracts have a combined potential value of $219 million over a five-year period of performance. Both the eastern and western zone TAT contracts were awarded in FY87 with a two-year base year each plus a two-year option. The Agency exercised the two-year option for both of these contracts in August 1988, extending the period of performance from October 1, 1988, through September 30, 1990.

One of the Region 3 mini-ERCS contracts that was awarded in FY88 was awarded to a minority firm under the provisions of Section 8(a) of the Small Business Act. In addition, EPA exercised the second option year of a Region 5 mini-ERCS contract that was awarded to a minority firm in FY87. In May 1988, the Agency terminated a mini-ERCS contract in Region 4 that was awarded to a minority firm in FY87.

Remedial Support Contracts

In FY88, EPA began the implementation of the Alternative Remedial Contract Strategy (ARCS), a substantial change in its remedial contracting program. The ARCS concept is aimed at maximizing competition in the remedial program, providing additional incentive for improved performance, injecting more contractors into the remedial contracting program, and promoting project continuity. Under ARCS, numerous smaller remedial response contracts are awarded continuously in each Region or, in some cases, in several Regions combined. Work is assigned to these contracts based on quality of performance and the program will emphasize keeping the same contractor involved in all phases of the cleanup process. The Regions will have complete responsibility for management of the ARCS contracts.

EPA awarded the first ARCS contracts in Regions 3 and 5 in January 1988. As of October 1988, EPA had awarded 18 of the anticipated 45 ARCS contracts. The remainder were awarded by July 1989. The ARCS contracts will range from $60 million to $250 million in potential value for 10-year periods of performance. ARCS contracts contain large subcontracting pools to maximize the numbers of contractors participating, as do the current remedial contracts.

Prior to the use of the ARCS contracts, EPA used Remedial Planning (REM) contracts to support the activities of the remedial program. There are presently three large REM contracts (II, III, and IV) and two smaller minority firm REM contracts that are active. Because these existing REM contracts cannot supply the necessary technical level of effort hours to support identified Regional project needs, EPA is developing alternative means of supplementing REM support to avoid program schedule delays. Alternatives being developed include the use of the U.S. Army Corps of Engineers (COE), the U.S. Bureau of Reclamation (BUREC), and ARCS contracts when available.

The Agency formed a workgroup during FY88 to develop a contracts training program for remedial project managers. The program would provide the tools and information necessary to ensure that tasks are managed more efficiently and effectively. EPA felt that it was imperative that RPMs be provided adequate training in contract management to improve the overall management of the

Superfund program. The workgroup completed course development by the end of FY88. The RPM contracts training course will be a three-day course with a potential audience of all RPMs, project officers, and contract officers.

9.2.4 Contract Operations Review and Assessment Staff

Because of the Superfund program's extensive reliance on contractor support, the planning, management, and administration of Superfund contracts has become one of the Agency's most important operational tasks. Superfund personnel involved in these activities are very visible and are subject to extensive oversight from a variety of external sources. In order to provide for internal proactive management of the Superfund contract program, EPA established the Contract Operations Review and Assessment Staff (CORAS), within the Office of Program Management (OPM) in FY88.

CORAS reports to the Director of the Office of Program Management (OPM), within OERR. The mission of CORAS is to assist OERR in the integrated and proactive management of the Superfund program's hazardous waste site cleanup activities, focusing on efforts undertaken through the use of contracts and other external relationships, such as interagency agreements, cooperative agreements, and grants. CORAS will assist Headquarters and Regional contract managers to effectively carry out their responsibilities. The staff will act as consultants to contract managers to facilitate the resolution of problems and to identify needed training programs and management tools.

CORAS also periodically distributes a bulletin that provides a forum for information exchange regarding Superfund contract management issues. The first CORAS bulletin was distributed in September 1988.

9.3 Training Activities

During FY88, OSWER conducted approximately 80 different training courses, seminars, and workshops. In all, over 300 sessions were attended by more than 10,000 individuals. EPA placed a particular emphasis on training programs to inform state and Regional personnel of the requirements for compliance with other statutes: courses were delivered in five of the Regions during FY88 and were scheduled to be offered in the remaining five Regions in early FY89. To address the increased demand for all Superfund training and the need to explore future alternative training methods, OSWER completed the development in FY88 of a five-year training strategy. The purposes of this strategy are to provide perspective on the past and present direction of OSWER's training program, identify clear goals and objectives for the program, and propose changes or enhancements that will make the program more responsive to current and anticipated needs.

Also during FY88, the Office of Program Management and Technology (OPMT) completed an assessment of training and technology transfer needs that was used extensively in the planning of OSWER training activities, and a training course catalog and corresponding calendar that presented current information on all training courses offered during the fiscal year. OSWER also began implementation of the Superfund Work Force Planning Project, a comprehensive effort by the various OSWER divisions to improve the training, retention, and management of Superfund personnel.

9.3.1 Overview

OSWER is responsible, under CERCLA section 311(b), for the coordination of training in the areas of solid and hazardous waste and emergency response. Activities related to these responsibilities include:

- Long-range planning, analysis, and evaluation;
- Identification of training requirements;
- Training development, delivery, and coordination within and among Program Offices and the Regions; and
- Management and training support to EPA Headquarters, Regions, and states, as requested.

The overall approach of the OSWER training program focuses on improving job performance, providing a consistent format for training development and delivery, and maximizing the effectiveness of training resources through the use of innovative training methods.

The Office of Program Management and Technology (OPMT) within OSWER is responsible for planning and policy development in the areas of research and development, technology transfer, and training. This office has specific responsibility for the development and implementation of long-term training and technology transfer strategies for OSWER, in conjunction with the Office of Research and Development (ORD). Technological innovations developed through research and demonstration programs, such as the Superfund Innovative Technology Exchange (SITE) program, are incorporated into technology transfer activities and training to ensure that advances in knowledge and skills are made available to Superfund staff.

Future of Training Programs: OSWER's Five-Year Strategy

The Agency completed the *OSWER 1989-1993 Training Strategy* during FY88. The strategy sets a clear direction for training efforts, addresses management issues, and promotes greater coordination at all levels. It affects all OSWER Program Offices, Headquarters staff, and Regional waste management, environmental services, and emergency and remedial response divisions. The aim of this new training strategy is to take a broad perspective of past and present OSWER training activities, to identify clear goals and objectives for training activities, and to create changes that will make the program more responsive to current and anticipated needs. The strategy will also help to promote necessary communication and cooperation among the various Program Offices, as OSWER programs evolve towards addressing common problems and as training needs become more similar.

The strategy reflects recent developments in the Superfund program that have led to changes in the direction of OSWER programs. These developments include a shift in emphasis from the development of regulations to the implementation of programs, expedited enforcement activities, congressionally mandated acceleration of remedial activities, and increased emphasis on assisting the states in managing and implementing solid and hazardous waste programs.

The OSWER five-year strategy sets out several broadly defined goals for OSWER training activities in the long-term, including:

- *Improved quality control*, through continued central management of the training program and improved implementation of training policies, as set out in *OSWER Training Policies and Procedures* (issued as OSWER Directive No. 9018.00-2, September 30, 1987).
- *Strengthened coordination and communication* through active participation of all Program Offices and Regions in OSWER training activities.
- *Development of structured curricula* based on job performance needs of the hazardous and solid waste programs to concentrate resources in fulfilling priority needs.
- *Enhancement of Regional and state training capability* through increased resources and improved management systems.
- *Emphasis on the use of alternative training delivery methods* to provide wider dissemination of training materials.
- *Institution of training monitoring and evaluation systems* to provide greater control over the efficiency and effectiveness of all OSWER training. The systems will maintain up-to-date information on current training activities, document program successes, and ensure the quality of OSWER training.

9.3.2 Meeting Critical OSWER Training Needs in Fiscal 1988

The OSWER Training Staff, in their function of coordinating training activities, works with the Program Offices and Regions in conducting a number of projects related to implementing the training policies and procedures, assisting in the implementation of Superfund training, and coordinating the development of training that cuts across program areas. Major factors that have affected the implementation of Superfund training during FY88 include:

- The need to move toward alternative delivery mechanisms in order to meet increasing training needs;
- The impact of the Superfund Amendments and Reauthorization Act (SARA) on program operations and training authorities, including training efforts of other federal agencies and private industry;
- The implementation of OSWER training policies and procedures;

- Plans for implementation of the Superfund Work Force Planning Initiative; and
- New management initiatives, such as the OSC/RPM Support Program.

OSWER Annual Training Plan for Fiscal 1988

The objective of the OSWER Annual Training Plan is to comply with EPA training policy, as spelled out in the *EPA Training and Development Manual*, and to provide a basis for comprehensive planning and coordination of OSWER training. The goal of the annual plan is to facilitate communication and coordination among OSWER organizations, to reduce duplication of effort, and to ensure the quality and consistency of training across OSWER offices. Each of the Program Offices and Regions were requested to submit information to Headquarters regarding their anticipated training development and delivery initiatives during the fiscal year; this information was then incorporated into the annual plan. Also addressed in the annual plan are ongoing OSWER efforts at management and coordination of training across Program Offices.

EPA training policy requires the completion of Training Planning Documents (TPDs) for all planned training development. The information contained in these TPDs defines the problem to be addressed by training, describes the intended target audience, outlines the overall objectives of the specific training program, and provides more detailed information regarding the subject matter, scheduling, resources, personnel, and estimated costs of the training. The information contained in TPDs was used during FY88 by training coordinators throughout OSWER in making decisions regarding requested funding support.

OSWER Training and Technology Transfer Needs Assessment

OPMT conducted the needs assessment for FY88 to support OSWER's resource estimates for FY88 and FY89, to help establish training priorities and determine where existing courses are most needed, and to ensure that current plans reflect the ongoing needs of hazardous and solid waste staff in the field. To assist in the assessment, OSWER Division Directors provided input about additional program priorities, relevant changes in program directions and operational procedures with impact on training needs, and areas requiring training course development.

The needs assessment was used extensively by the Regions and Program Offices in planning and scheduling courses. It pointed to the need for OSWER to work with the Program Offices in developing and managing training needs that cut across program areas. Training in this category includes orientation or overview types of training, ground-water training, health and safety training, and technology transfer seminars; these areas will be discussed below.

OSWER Training Course Catalogue and Training Calendar

In addition to the needs assessment, OPMT also compiled a Training Course Catalog and a corresponding Training Calendar for FY88. The course catalog, printed on a semi-annual basis, and the training calendar, with quarterly updates, provide Superfund personnel with information on currently offered courses, including: a brief course description, the contact person, the dates and the locations of the course, and the length of training. For the FY89 edition of the course catalog, additional information will be provided, including the course goal, target audience, alternate courses to choose from when a desired course is full, as well as a complete index of all available courses.

9.3.3 Priority Training Program Goals and Related Training Courses

Current OERR training activities focus on furthering two of the major broad objectives of the Superfund program: (1) to stabilize actual or potential threats from releases of hazardous substances, and (2) to ensure that environmental threats posed by uncontrolled hazardous waste sites are addressed quickly. Training courses were offered in EPA Headquarters, in the EPA Regions, and at Emergency Response Branch Training Centers in Cincinnati, Ohio, and Edison, New Jersey. The main priority areas addressed by training courses during FY88 include: management, emergency response, compliance with other statutes and regulations, program guidance, health and safety, ground-water technology, risk assessment and evaluation, emergency preparedness, and technology transfer. These areas and the related training courses designed to specifically address them are discussed in greater detail below.

Management Improvements in Technical and Programmatic Capabilities

OERR training efforts to enhance its work force capabilities are geared toward professional development and the improvement of overall program effectiveness. Courses related to this goal are designed to increase the programmatic and technical capabilities of Headquarters, Regional, and state personnel. Courses offered in this area for the first time during the fiscal year include: a CERCLA orientation course for both new and experienced personnel, a course on the management of construction activities in the Superfund program designed for Regional and state project managers, and a course providing an overview of the full range of hazardous materials cleanup technologies.

Environmental Response Team Training

The Emergency Response Division's Environmental Response Branch, also known as the Environmental Response Team (ERT), has been presenting a series of Hazardous Materials Incident Response Training courses since 1979. These courses are open to federal, state and local officials, and to personnel from private industry. Although the number of courses offered has increased to 190 weeks of courses in FY88, the need for additional courses continues to outpace the number available. Course titles offered in FY88 include *Air Surveillance for Hazardous Materials*, *Incident Mitigation and Treatment Methods*, and *Sampling for Hazardous Materials*.

To meet the demand for hazardous materials training courses, ERT has started a program that allows other training organizations to present these courses. The organization must agree to follow criteria established by ERD to maintain the quality of the courses before being accepted to present them; ERT will then provide all of the materials needed to present the courses. No funding will be provided to an organization accepted into the program, although

ERT will assist in presenting the first few courses. Through this cooperative program, the number of EPA courses presented will increase without a concurrent increase in the training budget.

Training on Revised Program Guidance

With the recent proposed revisions to the National Contingency Plan (NCP), OSWER has begun to develop new training and revise existing training to reflect these revisions. Also planned are guidance documents to accompany these training programs. A two-day workshop to provide an overview of the revised RI/FS guidance was developed and delivered in all ten Regions. Still under development are courses related to revisions in the Hazard Ranking System (HRS), Preliminary Assessment/Site Inspection (PA/SI), and Implementation of the Regulations on Reportable Quantity (RQ) Adjustments and Notification Requirements. Training courses related to revisions in guidance regarding Records of Decision (RODs) and Remedial Design/Remedial Action (RD/RA) also have been proposed.

Compliance with Other Statutes and Regulations

EPA has placed particular emphasis on training programs to inform state and Regional personnel of the requirements for CERCLA compliance with other statutes. Section 121(d) of CERCLA requires that, in the planning and conducting of remedial actions at Superfund sites, cleanup activities must comply with applicable or relevant and appropriate federal or state requirements (ARARs). Compliance is required at the completion of the remedial action for hazardous substances, pollutants, or contaminants that remain on-site.

EPA's Office of Emergency and Remedial Response (OERR) is providing training courses to EPA Regional and state personnel on information regarding ARARs. The goal of the training program is to improve performance in implementing the requirements relating to ARARs by providing EPA Regional staff (Regional Project Managers, On-Scene Coordinators, Regional Counsel and program staff), state staff, and contractors with guidance on identifying and complying with ARARs. In addition, a guidance manual to accompany these training courses has been developed.

A pilot training course and evaluation workshop was presented to both Regional and Headquarters staff in Washington, D.C., in May 1988. The training course was then delivered in Regions 2, 3, 4, 5, and 9 in June, July, and August of 1988. Due to requests from the remaining Regions, the course was offered in Regions 1, 6, 7, 8, and 10 in November 1988 through February 1989. Two additional sessions will be offered to Federal Facility personnel.

Health and Safety

Health and safety is an area of substantially increased training responsibility because SARA amended CERCLA to require 40 hours of safety training for any public or private workers involved in hazardous waste management or cleanup, and 8 hours of additional supervisory safety training. Superfund's ERT Training Program includes three courses that exemplify the type of safety training mandated under SARA. The National Institute of Environmental Health Sciences, under an interagency agreement with OSWER, is administering health and safety training grants which total 10 million dollars per year for a five-year period. To satisfy the large reported need for health and safety training demonstrated in the FY88 Needs Assessment ERT offered additional courses in this area and through Regional efforts conducted through their technical support contractors.

Ground-Water Training Initiatives

During the fiscal year, basic ground-water training was provided through Regional training initiatives and through the ERT Training Program course *Introduction to Ground-water Investigation*. The Agency also began a number of separate initiatives in FY88. OSWER continued in the process of installing ground-water work stations in the Regional offices and providing instruction in their use, and sponsored a project to provide computer-assisted job training aids for quality assurance in evaluating ground-water monitoring plans. OPMT, in coordination with the program offices, began development of a new ground-water curriculum to provide for the development of a new required ground-water training program. Also, the Office of Research and Development (ORD) is planning a series of technology transfer seminars in ground-water computer modeling to be provided by the R.S. Kerr Environmental Research Laboratory staff.

Risk Assessment

Critical training needs in risk assessment are being met through both Agency-wide and Superfund initiatives. Agency-wide training in this area is being coordinated by the Office of Policy and Program Evaluation (OPPE). OERR training in risk assessment includes two courses: *Environmental Risk Assessment*, offered through the ERT Training Program, and *Superfund Public Health Evaluation Process*, presented during late FY88 as a framework for public health assessments at Superfund sites.

Emergency Preparedness

During the fiscal year, work was performed on a proposal to package certain of the ERT safety and preparedness courses for dissemination through universities and state organizations who can meet established criteria for quality control. The OPMT Preparedness staff also worked on coordinating a joint training course with the Federal Emergency Management Agency on contingency planning and is currently evaluating other possible training development initiatives. Courses offered in this area during FY88 include *Hazardous Materials Response for First Responders*, *Hazardous Materials Contingency Planning*, and *SARA Title III Information Management Workshop*.

The Preparedness Staff addresses training needs in emergency preparedness through Regional training efforts, and through the coordinated efforts of the National Response Team (NRT) Training Subcommittee. NRT Training Subcommittee efforts include:

- A focused task analysis for local response teams, hazardous materials teams, and medical teams to ensure that training is related to job requirements in this area;

- The establishment of federal, state and local organizational relationships; and
- Gaining private industry support for a coordinated training system.

Regional efforts include the development and delivery of a number of First Responder training courses targeted to state and local officials.

Technology Transfer

The Center for Environmental Research Information (CERI), under the direction of the OSWER/ORD Research Committee, offered a series of technology transfer seminars during the fiscal year. These seminars, delivered primarily to the Regional offices, are directly relevant to Superfund training needs and program objectives. They are directed toward disseminating information and result from the development and evaluation of innovative technologies and waste management strategies. Among the technology transfer seminars delivered during FY88 are the following: *Transport and Transformation of Subsurface Pollutants, Alternative Treatment Technologies for Superfund Waste Sites, Solvent Waste Reduction Alternatives, Corrective Actions Series*, and *Hazardous Waste Landfill Design*.

9.3.4 Organizational Improvements in Fiscal 1988

During the fiscal year, the OSWER training program made significant progress as the result of several organizational improvements related to greater coordination of efforts and an increased management commitment to training and technology transfer. These organizational improvements are discussed below.

Alternative Training Delivery Methods

The target audience for OERR training has expanded significantly with the addition of new authorities for training of state, local, and private sector personnel. In addition, an increase in Superfund staff and new program directions have led to the need to implement new training methods to increase the efficiency of training resources. For these reasons, OERR developed the *Training Delivery Feasibility Study* to review the various delivery alternatives that will meet current and future OERR needs. The Study recommended appropriate solutions and laid out implementation plans and costs.

Superfund Work Force Planning Project

The Office of Program Management and Technology (OPMT) and the Office of Emergency and Remedial Response (OERR), in coordination with the Office of Human Resources Management (OHRM) and the Office of Waste Programs Enforcement (OWPE) combined forces to implement recommendations made in the *Superfund Work Force Planning Study* and the subsequent *GAO Report to Congress on Superfund Improvements Needed in Work Force Management*. The result of these efforts to improve the training, retention, and management of the Superfund work force included the creation of a new, revised training program for On-Scene Coordinators (OSCs) and Remedial Project Managers (RPMs). The purpose of the OSC/RPM Support Program is to provide OSCs, RPMs, and others involved in hazardous materials cleanups with specific career development and enhancement opportunities.

The OSC/RPM Support Program includes: the development of courses and case study institutes with emphasis on contracts management, legal training, site management, and complex technical problems; support for continuing education with multi-year employment commitments; design of an OSC/RPM structured training program; awards and recognition for outstanding performance; support for professional development; a review of compensation and classification practices; and improvement of the Superfund workforce planning techniques.

In its effort to use this program to provide better career opportunities for personnel and to retain them longer, OPMT and OERR have worked with advisors from various branches to assure that the program will meet employees' needs within program and personnel requirements. Notable progress has been made in several areas, including:

- *Superfund/University Training Institutes*: Five institutes have been funded for FY89 - East Tennessee State University, University of Cincinnati, University of Nevada-Las Vegas, University of Georgia, and a consortium of University of Oklahoma, Oklahoma State University, and Rice University.
- *Superfund Training Academy*: Work is underway to finalize a curriculum of required courses for new employees to be provided in two four-week sessions in one location. The first four-week session is expected to be held in Spring 1989.
- *Structured Training and Evaluation Program (STEP)*: OPMT and OERR are presently developing criteria recognizing employee accomplishment of specific requirements for various developmental levels. Certificates of accomplishment will be provided to several select senior employees, who will be grandfathered into the program.

Expanded Superfund Curriculum

During FY88, OSWER reviewed and expanded its training curriculum to meet critical Superfund training needs. These revisions were based on recommendations and data contained in the FY88 Training Needs Assessment, the Superfund Work Force Planning Project and the GAO study on work force management, and are contained in the *Superfund Work Force Training Resource Analysis*. OSWER training activities include detailed task analyses that lead to the development of curricula for specific types of jobs or subject areas. The curriculum serves as a tool for planners to use in determining how to meet training needs, and for supervisors to use in determining the training an employee needs to improve performance.

In addition to organizational changes in OSWER training activities, other significant changes occurred in areas related to Superfund training during FY88, including:

- *EPA Institute*: The EPA Institute was established to focus Agency-wide training efforts, and has made considerable progress in developing in-house training capabilities and expanding training opportunities. Coordination between OSWER and the Institute, at both Headquarters and Regional levels, will provide many benefits, including support in publicizing and scheduling training courses.

- *Technology Transfer*: EPA's active technology transfer program is forging new relationships among EPA, the states, academia, and private industry. To help meet Superfund's technical training needs, a series of Technology Support Centers located at ORD laboratories has recently been established. Superfund staff either travel to the centers to receive training, or courses developed at the centers are taken to the Regions. Future cooperative training development efforts, as authorized under the 1986 Federal Technology Transfer Act (FTTA), may include exclusive licensing and cooperative research and development agreements with private firms, universities, or consortia.

9.4 Management and Information Systems

Much progress has been made during FY88 in improving Superfund's management and information systems, to address the increased demands for data and information. Positive improvements in the Superfund program's main data base, CERCLIS, include the development of a local, personal-computer network with direct access to CERCLIS, the creation of both site-specific and non-site-specific data bases within the main CERCLIS system, and the establishment of a CERCLIS user support hotline. The OERR Superfund Directives System, a data base designed to track and update various Superfund program documents and directives, was further modified and updated. The Emergency Response Notification System was expanded in its data handling and organizing capabilities to aid various response authorities in the event of an emergency release. Improvements were also made in the data system containing technical information on many different hazardous substances, to further assist emergency response personnel in their efforts to reduce the threat of a release.

9.4.1 CERCLIS

The CERCLA Information System (CERCLIS) contains a detailed inventory of potential hazardous waste sites and provides key data elements for the monitoring of financial and technical progress of remedial, removal, and enforcement actions. OERR is responsible for maintaining and updating the CERCLIS data base. Currently, it contains data on approximately 39,000 sites. CERCLIS, in its present form, is the result of the integration of pre-existing data bases that no longer exist independently. Since the first generation of CERCLIS, EPA has incorporated into CERCLIS the information from the following systems: the Emergency and Remedial Response Information System (ERRIS), the Project Tracking System (PTS), the Superfund Comprehensive Accomplishments Plan (SCAP), the Removal Tracking System (RTS), the Case Management System (CMS), and the Remedial/Removal Financial System Site File.

Modifications to CERCLIS

During FY 1988, progress was made in modifying and updating the operational status of CERCLIS. Among the major changes accomplished during the fiscal year are the following:

- *Site-specific Data Base*: The site-specific data base became fully operational in November 1987. This data base is currently being used by all of the EPA Regions to store information on particular hazardous waste sites within each Region.

- *WASTELAN (Local Area Network)*: WASTELAN is a personal computer-based version of CERCLIS which operates as a local area network data base. The system became fully operational in Region 4 in November 1987. It contains all of the core data elements found in CERCLIS, including pre-remedial, remedial, removal, enforcement, and financial, as well as regionally-defined data elements for program and project management. WASTELAN's data handling capabilities include transfer of nationally-required information to the mainframe CERCLIS data base, retrieval of financial information from the Agency's Financial Management System (FMS), and the automatic loading of Superfund milestone data into project management software. The system also allows direct access to data by OSCs and RPMs.

  In addition to the system operating currently in Region 4, a trial version of WASTELAN was made available to all of the Regions for testing and evaluation. Implementation is currently underway in Regions 2, 3, and 5. Other Regions will also implement WASTELAN during FY90 as they complete their testing and evaluation processes.

- *Reports Library*: This menu-driven library of 130 pre-programmed reports related to the Superfund program and contained within CERCLIS was made available to both Headquarters and Regional users in December 1987. Currently, Headquarters and the Regions are printing more than 200 reports a day nationwide.

- *CERCLIS User Support Hotline*: The CERCLIS user support hotline became operational in March 1988. The hotline is staffed 11 hours each day to provide direct support to all Headquarters and Regional users, and currently responds to an average of 50 inquiries each week.

- *Non-Site-Specific Data Base*: A non-site-specific data base became operational in April 1988. This portion of the data base, which is separate from the site-specific data base, is maintained by Headquarters and is used for Regional evaluation. It contains the SCAP/SPMS targets and information on Advices of Allowance for each Region.

- *Financial Management System Automated Download into CERCLIS*: In April 1988, financial commitment, obligation, and outlay data from the FMS could be loaded directly into CERCLIS. This is the first time that such a loading of data has been done at EPA.

- *Superfund Progress Report from CERCLIS*: The Agency has been generating the Superfund Progress Report on a monthly basis directly from CERCLIS, beginning with the October 1988 report. In the past, the report was compiled from a variety of separate data bases; the conversion to an automated, CERCLIS-generated report reflects the increased reliance on CERCLIS and the progress made in improving the system's data quality. As a result, data elements in CERCLIS that are used in the report will be updated monthly.

- *175 RA Candidate Tracking*: OSWER is currently using CERCLIS to track the progress and status of the 175 RA candidate starts. CERCLA section 116(e)(1) mandates that remedial actions at all of these 175 sites be commenced by October 1989.

- *Coverage of Freedom of Information Act (FOIA), Congressional, and Other Information Requests*: EPA can now respond to non-recurring information requests, such as Congressional requests and some requests under the Freedom of Information Act (FOIA). The use of CERCLIS for responses to FOIA requests may, in many cases, result in little or no need for additional information or data collection. In some instances, though, such as when FOIA is used by potentially responsible parties to request information regarding enforcement sites, CERCLIS is not capable of responding and other resources are necessary to help provide the requested data. Data must now be kept up-to-date on at least a monthly basis, with both actual accomplishment data and current planning data covered. To support ongoing program and project management, Superfund managers are starting to request more frequent reports on program status from CERCLIS.

- *Monthly Management Reports*: These reports for OERR Senior Management and Assistant Administrators were developed during the fiscal year and scheduled for production beginning in September 1988. They provide a wide range of program performance data in areas of key concern. For Assistant Administrators, target and accomplishment data will be listed for selected SCAP/SPMS categories including first and subsequent RI/FS starts, first and subsequent RODs, first RD starts, and first RA starts. Enforcement target reporting includes RD/RA negotiations, RD/RA settlements, and cost recovery actions referred to Headquarters. The reports also will cover the status of progress toward beginning 175 RAs by the statutory deadline and analyses of RI/FS costs and duration. OERR Senior Management will receive a more extensive SCAP/SPMS accomplishment report, status reports on Regional advices of allowance, resource or full-time equivalent (FTE) utilization, and the CERCLIS-generated version of the Superfund Progress Report. These reports will increase dialogue between Headquarters and the Regions on program performance issues.

- *State Involvement*: OSWER is currently entering into an agreement with the National Governors' Association (NGA) to determine individual state Superfund information needs and current capabilities to meet those needs. This is similar to the work that the NGA is presently doing for the Resource Conservation and Recovery Information System (RCRIS) and will aid in the potential interaction of these two major OSWER information systems.

- *Corps of Engineers/Other Federal Agencies*: OSWER is presently working with both the Corps of Engineers and the Department of the Interior to determine whether CERCLIS can accommodate their Superfund project management and reporting needs.

Areas for Change in CERCLIS

Although there have been many improvements in the system during FY88, there are several problems that need to be addressed to further improve the system. Among these critical areas in need of change are:

- *Data Quality*: CERCLIS information can be sorted by many different fields, such as location, substance, and enforcement action taken. A major problem is that data entry is inconsistent and incomplete, with some fields left entirely blank. This lessens the effectiveness of CERCLIS in comprehensive program management reporting. In response, OERR is currently evaluating CERCLIS data in comparison to FY87 accomplishments, historical Superfund Progress Report data, and current SCAP targeting/planning data. These audit reports will be sent to the Regions on a regular basis so that figures can be reconciled.

- *System Response Time*: Although CERCLIS response time is fairly good, it is slow enough to create discontent. OSWER is currently negotiating with the NCC to expand the capabilities of its computer hardware systems and increase the systems' response time.

- *Complexity of the Data Base*: Regions have experienced difficulties in writing reports that combine enforcement activities with response events. This is because the enforcement data is not organized by operable unit in the data base. To help solve this problem, OSWER is evaluating the potential uses of WASTELAN, with its simplified report writing features and relational capabilities. In addition, to integrate response events with corresponding enforcement activities, OSWER is developing and programming reports for inclusion on the CERCLIS reports menu that serve this purpose.

- *Report Availability*: SCAP and SPMS reports were not finalized in time for the Regions to adequately review their data for accomplishment reporting. Problems in programming these reports were corrected and they are now on the CERCLIS system menu.

- *SCAP/SPMS Flags*: Regions are experiencing difficulties in coding all of the proper "flags" (e.g., first and subsequent starts and completions, SPMS targets, and site/event leads) in the data base so that plans and accomplishments appear on the official planning and evaluation reports. If these plans and accomplishments do not appear on the reports, they do not count toward meeting targets.

- *Data Requests to the Regions for "non-CERCLIS" data*: Many offices are still requesting from the Regions large amounts of data that are not contained in CERCLIS. Headquarters has set up focal points for Regional data requests to assure that Regions are not continually burdened with requests for available data.

9.4.2 Strategic Planning and Management System/Action Tracking System

The objective of the Strategic Planning and Management System (SPMS) is to develop a system of integrated planning guidance and oversight for program implementation. SPMS provides a framework for Headquarters, Regions, and states to identify and complete program agendas.

The Action Tracking System (ATS) component of SPMS follows the regulatory development of major regulations, guidance, and policies for all programs, including CERCLA and SARA. OSWER tracks the development of CERCLA and SARA guidance and regulations listed in the "Agency Operating Guidance" and in the *Federal Register* Unified Agenda. Information from the ATS can pinpoint potential or developing problems as regulations and guidance are developed and implemented.

9.4.3 Superfund Enforcement Tracking System

EPA is presently developing systems to help improve the implementation of Enforcement Program activities. The use of these systems will enable EPA to more efficiently target those responsible for hazardous waste, and thus help conserve the Agency's Fund resources. The Superfund Enforcement Tracking System (SETS) data base tracks information (e.g., names and addresses, mergers, etc.) on the Potentially Responsible Parties (PRPs) at each site. When a notice letter or special notice letter is sent to a PRP, that PRP's name is then entered directly into SETS. The information received is then sorted either by site or by PRP, so that it can be efficiently used during the enforcement process.

9.4.4 Case Budget System

This system tracks the enforcement work assignment activity and funds for the Technical Enforcement Support (TES) contracts. It includes all fund requests, fund allocations, and work assignment numbers.

9.4.5 Cost Documentation Monitoring System

The Cost Documentation Monitoring System (CDMS) supports cost documentation for section 107 case referrals. This data base contains detailed summaries of documented costs and the time remaining before the statute of limitations expires for each particular cost recovery effort.

9.4.6 Financial Management System

The Financial Management System (FMS) tracks "accounts receivable" by an individual PRP for each facility or site. Cost documentation (e.g., time sheets, travel vouchers, and contractor invoices) is entered on an optical disk so that EPA can retrieve pictures of the documents, rather than just a summary of the content. The entire universe of financial transactions in the Superfund program is recorded in FMS. This system will be replaced by the integrated FMS in January 1989, but the information held in the new system will remain essentially the same.

9.4.7 OSWER Internal Directives System

The OSWER Internal Directives System provides a systematic process for identifying and communicating policy and procedures to the Regions. This system establishes a document numbering system designed to track and manage all current program policy and guidance documents related to Superfund implementation. Additionally, the system allows identification of the approval level of directive documents, provides a central Regional location for all directives, and maintains a comprehensive index of valid directives.

Directives that originate in, or are issued by, one of the OSWER offices, Regional offices, or other EPA offices, and affect at least one of the Regional Waste Divisions or Environmental Services Divisions are considered appropriate for inclusion in the system. Also, documents issued by the Administrator or Deputy Administrator that are not included in the Agency Directives System will be included in the OSWER Directives System. Each directive is numbered to identify the originating office. Superfund Directives are numbered from 9200 through 9399.

OERR Superfund Directives System

The Regulatory and Special Projects Section (RSPS) in the Policy and Analysis Staff (PAS) is responsible for managing the OERR segment of the OSWER Internal Directives System. In managing its segment of the directives system, RSPS maintains a hard copy file of each document, tracks the development of draft directives (primarily guidance documents), and assigns each a number. RSPS also works with the originating office to track a document's status, plan revisions and updates, reissue a document if necessary, and coordinate the directives system with OSWER staff.

A major RSPS product in managing this responsibility is the *Catalog of Superfund Program Directives*, that lists all current OERR policy and technical and procedural directives. The catalog is updated periodically. Copies of OERR directives are available from the Superfund Docket or the Public Information Center; reference copies are kept in the EPA Headquarters and Regional libraries.

9.4.8 Emergency Response Notification System

The Emergency Response Notification System (ERNS) is a centralized data base containing more than 70,000 records of release notification reports received from the National Response Center (NRC), EPA Regions, the U.S. Coast Guard's (USCG) Marine Safety Information System (MSIS), and the Department of Transportation's (DOT) HAZMAT data base. ERNS is managed centrally by the Emergency Response Division (ERD), and it is maintained by DOT's Transportation Systems Center (TSC) in Cambridge, Massachusetts. The Regions receive and input data to their own respective ERNS on a continuing basis.

In October 1986, Phase I of ERNS was implemented. For the first time, every reported release of a CERCLA hazardous substance was documented in one uniform data base to which all appropriate agencies had access. The information has been used to provide initial evaluations of releases and to fulfill request for information from within the appropriate agencies and from other interested parties. Much of fiscal 1988 was spent adding final touches to the development of Phase II of ERNS. A pilot program to test the system's expanded capacity was implemented in Region 6 in early October 1988. With the addition of Phase II functions, the focus of ERNS will shift from being simply a warehouse of information to being a useful tool in verifying and assessing information received at the time of notification. Phase II provides a system for verifying the initial information received through a report, and for describing the sources and causes of a release in more detail. Eventually, EPA and the other appropriate agencies hope that ERNS will be used to track the entire lifespan of a release from notification to clean up.

During FY88, ERNS was revised to incorporate consistent methods of entering data into the system. No systematic process of describing a release or the quantity of a release had previously been available. Thus, the Agency has developed conversion tables that translate the language in which the notification was reported into consistent categories and quantities. Often when the NRC or the Regions receive notification of a release, the language in which it is reported is not clear or specific. For example, the person reporting the release might refer to "puddles" or "drips." The conversion tables allow such descriptions to be translated into specific quantities, such as gallons, barrels, or pounds. New notification report forms also have been created to aid in the systemization of data entry. When all data is entered in a consistent manner, searches and sorts of the information are much more easily accomplished. A person, for example, could obtain a list of all releases of a certain type of substance above a specific quantity. The ability to search and sort on a global scale allows the user to access data in a more efficient manner, and increases the usefulness of the system in general.

The information in ERNS is used by many different groups. The Office of Waste Programs Enforcement's (OWPE) enforcement division uses ERNS to identify PRPs. Title III personnel use the system to support their Accidental Release Information Program. The Toxics Integration Branch of EPA's Hazardous Site Evaluation Division (HSED) performs trends analysis using data from ERNS. The Department of Transportation also uses the information to investigate transportation-related releases. EPA will develop periodic reports that focus on release trends of oil and hazardous substances.

9.4.9 Accident Release Information Program

The Accident Release Information Program (ARIP) data base lists certain non-transportation-related acute releases of hazardous materials recorded in ERNS. The data base includes information on the type of acute event, when and where it occurred, whether any injuries or fatalities occurred, the type of facility or site involved, the preventative and control measures existing at the site prior to the spill, and the actions taken as a result of the spill. The data base has a two-pronged objective: (1) to create a national data base of major spills and prevention techniques used at facilities and sites; and (2) to provide Regions with data about acute events in their Region so that they can do follow-up inspections or undertake enforcement actions.

9.4.10 Acute Hazardous Events Data Base

The Acute Hazardous Events (AHE) data base was assembled as part of EPA's review of the dangers posed to the public and industrial workers by sudden, accidental releases of toxic chemicals. The main purpose of the AHE data base is to characterize the types of events that emit acutely toxic substances in the United States, the substances involved, and the causative factors leading to the release.

Emphasis in the data base is placed on obtaining a measure of the scope of events rather than on precisely estimating quantities or frequencies of releases. It purposely is biased toward events considered to have the greatest potential for sudden, large-scale harm to the populace. A new coding system has been applied to the data base to make it more quantitative. Currently, it includes quantitative data on deaths and injuries caused by acute events, and the number of individuals evacuated. Information is coded by causation and location of facility.

9.4.11 Oil and Hazardous Materials Technical Assistance Data System

The Oil and Hazardous Materials Technical Assistance Data System (OHMTADS) is an automated information retrieval data base containing 126 fields of information on physical, chemical, biological, toxicological, and commercial data on approximately 1,400 oil wastes and hazardous materials that are potentially harmful to human health and welfare and the environment. OHMTADS was developed to assist emergency response personnel in identifying hazardous substances, the health and environmental threats associated with these substances, and the techniques for mitigating hazards caused by the release of the substances during emergency situations and at hazardous waste disposal sites.

Since the passage of CERCLA, the role of OHMTADS has changed significantly. SARA mandated that chemical information be made available to the public for all chemicals on the SARA Title III lists. During FY88, EPA's OSCs and other expert users of chemical information systems were interviewed to assist in the revision of OHMTADS. The Emergency Response Division (ERD) is currently in the process of conducting a needs analysis survey of OHMTADS to determine how well it supports OSCs, what specific changes could be implemented to make it more useful and cost effective, how it relates to other automated systems that store similar chemical data, and what relationship OHMTADS may have with SARA Title III.

9.5 General Rulemakings

EPA initiated a number of rulemakings during FY88, including revisions to the HRS and to the NCP. The Agency also developed rules adjusting reportable quantities for CERCLA hazardous substances and interpreting statutory reporting requirements for continuous and federally permitted releases. These and other rulemakings initiated by EPA are discussed in this section of the Report.

9.5.1 Revision of the National Contingency Plan and the Hazard Ranking System

Two of the most significant rulemakings developed by the Agency during the fiscal year are the proposed revisions to the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and the proposed revisions to the Hazard Ranking System (HRS). The revisions to both the NCP and the HRS incorporate the statutory provisions of CERCLA, as amended by SARA.

9.5.1.1 National Contingency Plan

Pursuant to section 105 of CERCLA, EPA has published a proposal to revise the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The NCP is the primary regulation directing government and potentially responsible party responses to cleanup of releases of hazardous substances, pollutants, contaminants and to discharges of oil. It outlines the steps that EPA, the Coast Guard, and other federal agencies must follow in responding to a situation in which hazardous substances or oil are released or are likely to be released into the environment. The NCP was first promulgated under section 311 of the Clean Water Act and was last revised, under CERCLA, on November 20, 1985.

The purpose of the proposed revision is to incorporate new statutory requirements and to set forth EPA's revised approach to responding to the release of hazardous substances. Important changes in this approach have been suggested by EPA's experience in implementing the response program since 1980. The revised NCP reflects more accurately the sequence in which response actions are taken and clarifies the roles, responsibilities, and activities of all parties involved in a response action.

The proposed revisions to the NCP address a number of key issues pertaining to the response programs:

Remedy Selection

For the remedial program, the proposed revisions outline a process whereby site problems and threats are identified and defined, and a range of remedial alternatives is developed and screened. Promising alternatives are then analyzed against nine criteria. Overall protection of human health and the environment, and compliance with applicable or relevant and appropriate requirements (or invocation of a waiver) are threshold criteria that must be satisfied in order for an alternative to be eligible for selection. Long-term effectiveness and permanence; reduction of toxicity, mobility, or volume; short-term effectiveness; implementability; and cost are the primary balancing factors used to weigh major trade-offs among alternative hazardous waste management strategies. State and community acceptance are modifying considerations that are formally taken into account after public comment is received on a proposed plan. After considering public comment and reevaluating the proposed remedial alternative relative to the same criteria, EPA selects the response action.

Early Action

The proposed NCP also encourages and provides the opportunity for taking "early action," i.e., undertaking response activity before or during the RI/FS process. Early actions are initiated to contain and/or reduce the level of contamination, or to bring hazards at a site under control. Related to early action is the principle of "streamlining." This principle encourages the tailoring of activities conducted during the RI/FS and selection of remedy to the scope and complexity of the site problem.

Applicable or Relevant and Appropriate Requirements

Section 121(d)(2)(A) of CERCLA, as amended, requires that all remedial response actions meet or exceed state and federal applicable or relevant and appropriate requirements (ARARs). The proposed NCP provides an extensive explanation of when provisions of the Resource Conservation and Recovery Act (RCRA), as well as other federal and state standards or regulations, are potential ARARs. Also, the proposed NCP states that maximum contaminant levels (MCLs) under the Safe Drinking Water Act will generally be relevant and appropriate requirements for the remediation of surface or ground water that is or may be used for drinking water. Maximum contaminant level goals (MCLGs) will be considered where relevant and appropriate, as in circumstances in which the aggregate risk from multiple contaminants or pathways exceeds 10^{-4}. The proposal describes points in the RI/FS process when certain types of ARARs should be identified and provides details regarding the identification and communication of state ARARs.

Role of States

The proposed NCP implements the statutory requirement for more extensive state involvement through the Superfund Memorandum of Agreement (SMOA) and the process of EPA/state concurrence in remedy selection. The SMOA may be used to establish the general framework for the EPA/state working relationship, to define the roles and responsibilities of the lead and support agencies, and to provide general requirements for EPA oversight. SMOAs are intended to ensure equitable relationships between EPA and states and to reduce misunderstandings by clarifying the expectations of both parties. The process of concurrence will be offered only when a SMOA is established. EPA anticipates that the concurrence process will increase EPA involvement at state-lead, non-Fund-financed sites and will provide for greater state involvement in the selection of remedial actions at Fund-financed sites.

Statutory Revisions to Removal Action Time and Dollar Limitations

The statutory revisions to the dollar and time limitations on removal actions are incorporated in the NCP. CERCLA, as amended, increased the limit on time that can be spent conducting a removal from six months to one year, and raised the amount of money that can be spent for a removal from $1,000,000 to $2,000,000. CERCLA also provided an exemption from the time and dollar removal limits when continued response is consistent with the remedial action to be taken. The preamble to the proposed revisions also specifies when it would be appropriate for the Agency to invoke the exemption. The regulation incorporates the statutory requirement that removal actions should, to the extent practicable, contribute to the efficient performance of any long-term remedial action. The preamble provides guidance on complying with this requirement. In addition, the preamble explains EPA's policy that removal actions should comply with ARARs to the extent practicable.

Community Relations

The proposed revised NCP specifies public participation requirements, including conducting community interviews, developing community relations plans, making proposal alternatives available for public comment, and responding to comments received. It also describes the extent to which the requirements apply to the varied types of action taken under CERCLA. Public participation requirements vary somewhat among the different types of removal actions (emergency, time critical, and non-time critical) and between removal and remedial actions.

Also, the proposed revisions incorporate the statutory requirement for an administrative record that contains documents that form the basis for the selection of a CERCLA response action. New Subpart I states that the record shall include all documents that form the basis of the Agency's decision when it selects the response action for a site. Subpart I also specifies when new documents may be added to the record after a decision document is signed. The rule proposes that the record for remedial actions shall be available at the commencement of the RI. The NCP further proposes that the record shall be available for review at a location at or near the site, and at an office of the lead agency or at another central location (the record for emergency actions need only be kept at the central location).

9.5.1.2 Hazard Ranking System

During FY88, the Agency undertook a major revision of the HRS, the Superfund pre-remedial tool used to identify sites warranting consideration for inclusion on the NPL. The proposed changes to the HRS will make it a more comprehensive ranking system, taking into account two new exposure pathways -- the human food chain and the on-site pathway, that considers among other factors, direct contact with soils -- and making the definition of "sensitive environments" more inclusive. In addition, the revised HRS will consider both acute and chronic health effects. The revisions will result in a ranking system that is more accurate in assessing potential for exposure, contaminant concentration, and contaminant toxicity. As a result, the HRS will be a better tool for identifying the most problematic sites.

The HRS rulemaking effort achieved several important milestones during FY88, including: (1) workgroup closure: (2) Agency review; and (3) Science Advisory Board (SAB) review. The proposed HRS incorporating Agency and SAB revisions was sent to OMB in February 1988 for review and was proposed on December 23, 1988.

HRS Pilot Program

The Agency began implementation of the second phase of a pilot program that tests the new and expanded capabilities of the revised proposed HRS. EPA's objectives for this pilot program are to (1) determine data requirements, cost, and time for conducting preliminary assessments (PAs), screening site inspections (SSIs), and listing site inspections (LSIs) under the revised HRS; (2) test decision point scores and other evaluation tools used during the pre-remedial process to identify NPL candidate sites; and (3) provide information for PA, SSI, and LSI guidance documents.

A Phase II project orientation meeting was held in June 1988 to discuss project objectives, schedules, and work products. Subsequently, the Agency selected 75 sites on which to conduct PAs, using the revised HRS process. SSIs were conducted on 35 of the 75 sites and LSIs should be completed for appropriate sites by June 1989.

Potential to Release Component

A major change to the HRS is the addition of a "potential to release component" when calculating the risk to the air pathway. This addition is the result of statutory requirements, EPA experience, public comments, and the Science Advisory Board's recommendations. The scores of sites will more than likely rise when the threat posed by a potential air release is included in the scoring.

On-Site Exposure

The proposed revision includes risks associated with the possibility of being exposed while on the site. Potential on-site risks were not originally included when developing the HRS because the Agency assumed that threats from direct contact would be mitigated through emergency removal actions. EPA's experience at NPL sites such as Times Beach, Missouri, and Mountain View Mobile Homes, Globe, Arizona, however, has shown that at some sites risks associated with direct contact or on-site exposure still exist after removal actions are completed.

Surface-Water Contamination

The method by which a score is determined for the threat posed by surface water contamination is also being changed. The revision amends the surface water pathway score to include threats posed by contamination of the human food chain and contamination of water that is used for recreational purposes. The updated HRS will evaluate the possible effects on the aquatic food chain of an actual or potential release. An EPA study that included a site-specific assessment involving 12 sites and 27 chemicals verified that the human health risk near some NPL sites can be significant due to recreational use of surface water.

Human Exposure to Contaminants

The current HRS evaluates the potential for human exposure to contaminants at sites, but it does not give additional consideration when actual human exposure is documented. The current HRS also does not differentiate among different levels of exposure. It is oriented toward overall population risk as opposed to individual risk. CERCLA section 105(c) requires EPA to assure that to the maximum extent feasible, the HRS assesses accurately the relative degree of risk to human health and the environment posed by sites that are evaluated. Thus, the revised HRS will reflect the potential risk to individuals and to populations exposed to actual contamination. This will be accomplished by attaching more importance to the ground and surface water pathways at sites where there is documented proof of the contamination of wells or drinking water.

9.5.2 Administrative Record

On March 1, 1989, EPA issued an *Interim Guidance on Administrative Records for the Selection of CERCLA Response Actions*. This guidance reflects the proposed revisions to the National Contingency Plan (NCP) that were published on December 21, 1988. The Agency may refine the guidance when it promulgates the NCP in final form. During FY88, the Agency conducted training in all ten Regions to ensure that adequate records are being compiled. The Agency also made presentations to staff of the Department of the Interior and the Department of Energy on their role in maintaining the records for federal facilities under their jurisdiction. In FY88, the Agency established a basic evaluation and tracking system to assist in the setting of priorities for record compilation.

9.5.2.1 Purpose of the Administrative Record

The requirements for establishing administrative records form one of the key new subparts of the proposed revised NCP. The administrative record serves two primary purposes. First, under CERCLA section 113(j), the administrative record will serve as the basis for judicial review of any clean-up action. As a result, potentially responsible parties (PRPs) or citizens must raise arguments or concerns during the administrative process, or they will be barred from raising them for the first time in court. Record review also saves time by limiting the scope of any trials to the contents of their written records, rather than broadening them to include oral testimony and discovery, thereby saving the Agency's resources for cleanup, rather than litigation.

Second, section 113(k) requires that the administrative record act as a vehicle for public participation in the selection of the response action. Participation by interested persons ensures that the Agency has considered the concerns of the public, including PRPs, in selecting response actions. The administrative record includes documents that form the basis for the Agency's action at the site. The record is compiled as the Agency receives or generates the necessary response action documents. Every decision document is supported by an administrative record.

Without an opportunity for involvement of interested parties in the development of the administrative record, persons challenging a response action may argue that judicial review should not be limited to the record. The Agency must, therefore, make the information that formed the basis for the selection of a response action available, at or near the site to the public, provide an appropriate opportunity for public comment on this information and publish a notice of its availability in a local newspaper, place comments and information received from the public in the record, and reflect in the record the Agency's consideration of this information. Documents generated or received after the decision document is signed are added to the record only if they concern issues that were specifically reserved or if they support an amended action memorandum.

9.5.2.2 Availability of the Administrative Record

The availability of the record varies depending on the nature of the response action. For remedial actions, the record becomes available at the start of the remedial investigation/feasibility study (RI/FS). Section 113(k)(2)(A) requires the Agency to establish procedures for the appropriate participation of interested persons in administrative records for removal actions. "Appropriate" participation depends on the nature of the removal. The record for a non-time-critical removal action is available when the engineering evaluation/cost analysis (EE/CA) is made available for public comment. In contrast, the record file for time-critical removal actions is available no later than 60 days after the initiation of on-site removal activity. If feasible, the record file for these removal actions is made available earlier. The same procedures are used for establishing administrative records whether or not the response action involves enforcement activity.

9.5.3 Reportable Quantities

The Agency developed two rulemakings during the fiscal year adjusting the reportable quantities for specific CERCLA hazardous substances. One rule adjusts reporting levels for 273 CERCLA hazardous substances, the majority of which are carcinogens. A second rule adjusts the reporting levels of 757 radionuclides.

The reporting requirements in sections 103(a) and (b) of CERCLA require that persons in charge of vessels or facilities from which hazardous substances have been released in quantities that are equal to or greater than their reportable quantities (RQs) immediately notify the National Response Center of the release. Section 102(b) sets an RQ of one pound for hazardous substances, except those substances for which different RQs have been established pursuant to section 311(b)(4) of the Clean Water Act (CWA). In addition to these reporting requirements, section 304 of the Superfund Amendments and Reauthorization Act of 1986 (SARA Title III) requires that releases of hazardous substances in quantities equal to or greater than their RQs (or one pound if a reporting trigger is not established by regulation) be reported to state and local authorities.

Section 102(a) of CERCLA authorizes EPA to adjust RQs for hazardous substances and to designate as hazardous substances those that, when released into the environment, may present substantial danger to the public health or welfare or the environment. Currently, there are 725 CERCLA hazardous substances.

9.5.3.1 Reportable Quantity Adjustment Final Rule

The Agency made substantial progress on the final rulemaking adjusting the RQs for 273 CERCLA hazardous substances during the fiscal year. The majority of RQs being adjusted by this rule are RQs for potential carcinogens. In order to give the public opportunity to comment, the Agency published in the *Federal Register* on March 16, 1987, a Notice of Proposed Rulemaking (NPRM) to adjust RQs for 273 CERCLA hazardous substances. Two final rules adjusting the RQs of 260 of the 273 hazardous substances were published in August 1989. RQs for four additional hazardous substances that were not proposed for adjustment in the March 16, 1987, NPRM were also included in these final rules. The four additional substances are waste streams that were listed as hazardous under RCRA Section 3001 (and, therefore, were designated as hazardous under CERCLA) after the March 16, 1987, proposal was published.

The Agency adjusted the RQs of the hazardous substances based on specific scientific and technical criteria that relate to the possibility of harm from the release of a hazardous substance at certain levels. The quantity released is but one factor considered by the government when assessing the need to respond to such a release. Other factors, assessed on a case-by-case basis, include, but are not limited to: (1) the location of the release; (2) its proximity to drinking water supplies or other valuable resources; and (3) the likelihood of exposure or injury to nearby populations. The RQ adjustments in this final rule will enable the Agency to focus its resources on those releases that are most likely to pose potential threats to public health or welfare or the environment. These adjustments will also relieve the regulated community and emergency response personnel from the burden of making and responding to reports of releases that are unlikely to pose such threats.

9.5.3.2 Radionuclides Reportable Quantity Adjustment

The Agency also made progress in FY88 on the final rulemaking adjusting the statutory reportable quantity of one pound for radionuclides. Radionuclides are considered CERCLA hazardous substances because they are designated as a hazardous air pollutants under section 112 of the Clean Air Act. Radionuclides are comprised of approximately 1,500 radioactive isotopes whose release represents differing degrees of potential harm to human health and the environment. In the rulemaking, the Agency finalized RQs for 757 individually listed radionuclides, and established an RQ of 1 curie for all other radionuclides. Radionuclide RQs are expressed in units of curies rather than pounds because curies are a more common unit of measurement for radiation protection, allowing for more timely reporting and response, if necessary. To issue adjusted RQs for radionuclides, the Agency developed a new methodology that was presented for public comment in a notice of proposed rulemaking published in the *Federal Register* on March 16, 1987 (52 *FR* 8172). The Agency has revised the methodology in response to comments on the proposed rule. The methodology adjusts RQs for radionuclides based on release scenarios and assigns radionuclides to one of seven RQ groups: 0.001 curie, 0.01 curie, 0.1 curie, 1 curie, 10 curies, 100 curies, and 1000 curies. The final rule was published in the *Federal Register* on May 24, 1989 (54 *FR* 22524).

9.5.4 Federally Permitted and Continuous Releases

The Agency published two proposed rules that interpret statutory reporting provisions during the fiscal year. The first presents the Agency's interpretation of the statutory requirements of CERCLA section 103(f)(2) for continuous releases. The second proposed rule presents EPA's explanation of the exemptions under CERCLA section 101(10) for federally permitted releases.

9.5.4.1 The Continuous Release Proposed Rule

On April 19, 1988, EPA published a proposed rule interpreting the reduced reporting requirements for continuous releases under CERCLA section 103(f)(2). This rule stipulates that initial notification of continuous releases must be made under section 103(a) to establish the continuity, quantity, and regularity of the release, or under section 103(c) that requires notification to the federal government of the existence of certain facilities that are or have been used for storage, treatment, or disposal of hazardous wastes but do not have RCRA interim status or a RCRA permit. Section 103(f)(2) presupposes that, in general, if a release occurs regularly and in relatively stable amounts, federal officials do not have to be notified each time the release occurs to have the necessary information to decide whether a response is desirable. Thus, instead of reporting every release as it occurs, the person in charge of a vessel or a facility is allowed to report less often for continuous releases that satisfy the above criteria.

9.5.4.2 The Federally Permitted Release Proposed Rule

On July 19, 1988, the Agency published a proposed rule interpreting the federally permitted release exemption from CERCLA release reporting and liability provisions. CERCLA section 101(10) lists the statutes or regulatory programs under which the exemptions arise. For example, discharges in compliance with a National Pollutant Discharge Elimination System (NPDES) permit, releases in compliance with a legally enforceable RCRA hazardous waste management facility final permit, or air emissions subject to and in compliance with permit or control regulations under certain provisions of the Clean Air Act are exempt from the reporting requirements under CERCLA section 103(a) and from liability for response costs and damages due to the release (CERCLA section 107(j)). The proposed rule also addresses the exemption from notification requirements under Title III of the Superfund Amendments and Reauthorization Act of 1986.

9.5.5 The Designation Proposed Rule

During FY88, EPA's work on a rule proposing to designate 232 extremely hazardous substances (EHSs) listed pursuant to Title III of SARA as CERCLA hazardous substances neared completion. The rule completed red border review and OMB review during the fiscal year and was proposed on January 23, 1989.

Although 134 substances listed as EHSs under SARA Title III are already CERCLA hazardous substances, there are 232 that are not. Currently, only releases of those EHSs that are also CERCLA hazardous substances are required to be reported to the National Response Center (NRC). With the proposed rule, EPA intends to reduce potential confusion concerning the different SARA Title III and CERCLA requirements by ensuring consistent procedures for reporting releases of all EHSs. In addition, the January 23, 1989, proposal would facilitate an expedited determination of the need for a federal response to such releases.

9.5.6 Reimbursement to Local Governments

EPA published an interim final rule to provide reimbursement to local governments for costs of temporary emergency measures taken to prevent or mitigate injury to human health or the environment. This regulation is meant to help alleviate significant financial burden on local governments for costs incurred in responding to releases or threatened releases of hazardous substances. CERCLA requires, however, that reimbursement must not supplant local funds normally provided for response. As of October 6, 1988, only seven applications had been received requesting reimbursement. The Emergency Response Division (ERD) is, therefore, investigating whether the eligibility regulations are unnecessarily stringent. ERD, however, has decided to try to publicize the availability of reimbursement more widely prior to revising the rule.

9.5.7 Technical Assistance Grants

The Agency published an interim final rule on March 24, 1988, that details the specific requirements for obtaining technical assistance grants (TAG). TAGs are grants of up $50,000 that can be awarded by EPA to citizens' group in order for the groups to obtain assistance in interpreting information related to cleanups at Superfund sites. The process of cleaning up a Superfund site requires detailed technical study of site conditions and waste, analysis of methods and techniques for remediation, and decisions based upon statutory and regulatory factors. In carrying out these cleanups, EPA and states seek informed comment from citizens living near these sites. TAGS, authorized by Congress under section 117(e) of CERCLA, allow the citizens to have technical site information interpreted so that they can better understand site conditions and clean-up options. The citizens will thus be able to provide EPA with informed comment concerning response actions to be taken at a site.

9.5.8 Citizen Awards for Information on Criminal Violations Under Superfund

EPA published on May 5, 1988, an interim-final rule that sets forth the requirements for obtaining an award for providing information leading to the successful prosecution of any person for a criminal violation of CERCLA. CERCLA section 109(d), as amended, authorizes the President to pay up to $10,000 to any individual who provides information leading to arrest and conviction. This rule establishes who is eligible for obtaining an award and who within EPA shall make the determination of eligibility. The rule also details procedures and requirements for filing a claim, establishes the criteria for payment of an award, and provides an assurance of confidentiality to those who provide information. The Agency believes that the availability of cash awards will provide an incentive for individuals to report violations of CERCLA.

9.5.9 Other Rulemakings

The Agency published on August 4, 1988, a proposed rule that would establish and govern procedures for EPA's arbitration of small CERCLA section 107(a) cost recovery claims. CERCLA section 122(h)(2) authorizes the head of any department or agency with authority to undertake response action under CERCLA to use arbitration as a method for recovering response costs that do not exceed $500,000 at a facility (excluding interest). (If over $500,000, the Department of Justice must concur.) In order to use arbitration, EPA and one or more PRP must agree to submit an issue or issues arising in an EPA cost recovery claim to an arbitrator for resolution.

EPA published a final rule on August 22, 1988, that amends the EPA Acquisition Regulation to allow the Agency to employ other than competitive procedures in obtaining expert services to be used in preparing or prosecuting a civil or criminal action under CERCLA. The purpose of the final rule is to incorporate the provisions of SARA which authorizes the use of other than competitive procedures in acquiring the services of experts.

10.0 MINORITY FIRM PARTICIPATION IN SUPERFUND CONTRACTING

The 1986 enactment of SARA added to CERCLA a new provision (Section 105(f) of the amended CERCLA) that requires that the availability of minority businesses be considered in awarding contracts for Superfund work.

The EPA's Office of Small and Disadvantaged Business Utilization (OSDBU) is responsible for assuring compliance with section 105(f) and has prepared the following chapter of this Report to satisfy those requirements for fiscal 1988.

10.1 Identifying Qualified Minority Firms

EPA employed an extensive program to identify minority firms for potential work opportunities as either prime contractors or subcontractors in the Superfund Program. In cooperation with the Minority Business Development Agency (MBDA) of the U.S. Department of Commerce, EPA screened the MBDA Profile System to identify qualified minority firms for potential contracting opportunities. The Profile System includes all minority firms from the Small Business Administration's Procurement Automated Source System (PASS). Through this search, OSDBU identified 268 minority contractors having Standard Industrial Classifications (SIC) codes that would lend themselves to the Superfund Program. OSDBU contacted these 268 firms individually by letter to inform them of the contracting and training opportunities available under Superfund. The U.S. Postal Service returned more than 50 percent of the letters. Twenty firms responded to the Agency's informational letters, and most of these firms attended the EPA-sponsored Superfund Training Program conducted by the National Association of Minority Contractors (NAMC).

A number of firms contacted the OSDBU independently, inquiring about contracting opportunities. Some of these firms have the Small Business Administration's (SBA) Section 8(a) Certification and, where possible, OSDBU has screened these firms for future consideration.

10.2 Efforts to Encourage Participation

EPA has also attempted to bring qualified firms into the Superfund minority contracting program in several other ways.

Hazardous Waste Cleanup Training Program: On January 14, 1988, EPA entered into a contract with the NAMC to conduct hazardous waste cleanup training programs, with a potential value of $500,000. The NAMC conducted training in four cities (New York, NY, Columbus, OH, Los Angeles, CA, and Dallas, TX). The training was directed toward small and minority businesses. Of the total enrolled (134 individuals represented 100 firms), 127 individuals represented 95 minority firms. The training consisted of a Superfund orientation and information on safety and health and procurement, and was designed to make the firms eligible for contracting opportunities in the hazardous waste clean-up program.

State Information Seminars: In FY88, two minority business enterprise (MBE) conferences were held: one by the State of Mississippi, and the other by the States of Maine, Vermont, and New Hampshire, jointly. The purpose of the conferences was to familiarize MBEs with contracting opportunities available under Superfund. Representatives from approximately 150 firms attended these conferences.

Also, EPA signed State Cooperative Agreements with the States of Washington and New Jersey enabling these states to conduct State MBE/Women's Business Enterprise (WBE) Information Seminars. These seminars were planned for FY88, however, due to administrative difficulties they were rescheduled. Currently, the New Jersey seminar is scheduled for April 1989 and the Washington seminar is scheduled for later in FY89.

Because of the success of the state seminars, EPA will sponsor four additional seminars in Georgia, Ohio, Louisiana, and California. Scheduling is dependent upon the availability of funds and the award of cooperative agreements.

Minority Procurement Conferences: OSDBU, in cooperation with EPA's Procurement and Contracts Management Division, sponsored a highly successful conference in Cincinnati, Ohio. Representatives of approximately 150 minority firms attended.

Special Meetings with Major Superfund Prime Contractors: EPA held special meetings with the major Superfund prime contractors in an effort to increase their use of minority business subcontractors. As a result of these meetings, EPA will implement outreach programs that identify minority firms for subcontracting opportunities, develop policy guidelines to promote subcontracting activity with minority firms, establish a vendors' information system to identify prospective minority firms for bid solicitations, and establish procedures to debrief unsuccessful minority bidders. These special meetings appear to be effective, as subcontracting work conducted by minority firms on these major contracts is increasing.

Congressional Workshops for Superfund Program: At the request of U.S. Representative Mervyn Dymally, OSDBU and the Contracts and Procurement Division staff participated in a Procurement Conference conducted in Carson City, California, in February 1988. OSDBU used this conference as an outreach opportunity to advertise the EPA Superfund Training Program for minority contractors. Representatives of approximately 200 firms attended this workshop.

At the request of U.S. Representative John Lewis, OSDBU participated in a workshop conducted in Washington, D.C., in June 1988, to discuss Superfund opportunities with the Atlanta Business League. Over 50 minority business persons attended the workshop.

OSDBU Training Workshops: OSDBU conducts MBE/WBE Training Workshops for EPA Regional, state, and local officials. OSDBU held workshops in seven EPA Regions, involving 39 states, with approximately 350 officials in attendance. OSDBU also conducted special Superfund workshops in two Regions, involving 14 states, and in response to a special request by the State of California, conducted Superfund training in Sacramento in September 1988.

OSDBU Superfund Listing of Minority Contractors: During the fiscal year, OSDBU began to identify qualified minority contractors for possible Superfund opportunities in the future. OSDBU has retained the names of all individuals and firms who attended the Hazardous Waste Cleanup Training Program and has contacted each individual and/or firm to develop capability statements for use in future Superfund work. OSDBU will maintain the listing and make it available to all interested sources, including, but not limited to, EPA's Procurement and Contracting Operations nationwide, major prime contractors doing Superfund work, state authorities conducting Superfund operations, and other federal agencies and departments.

MBDA Annual Conference: In August 1988, MBDA conducted its annual conference that included representatives from MBDA regional offices and all Minority Business Development Centers (MBDC). EPA was invited to have a special session involving minority contractor utilization in Superfund work. A special team of EPA personnel presented all attendees with an overview of the Superfund Program. EPA also asked the MBDC representatives to identify potential candidates for training and procurement opportunities.

OSDBU Annual Workshop: The OSDBU annual MBE/WBE workshop took place in Dallas, Texas, on April 12 and 13, 1988. The principal emphasis of this workshop was to establish the need for greater minority contractor participation in the Superfund Program.

Letters to Other Federal Agencies Participating in the Superfund Program: OSDBU sent letters to other federal agencies and departments that participate in the Superfund program. The letters stress the importance of the use of minority contractors in any procurement activity that is funded by Superfund monies. This was the second successive year that OSDBU has emphasized the importance of the use of minority contractors and also the importance of timely reporting of such utilization for incorporation into the Report to Congress. The dollar amounts that went to minority contractors in FY88 are small. In an effort to increase the dollar amounts, OSDBU is planning to meet with federal agencies that have the largest expenditures under Superfund interagency agreements in an attempt to increase the number of contracts and subcontracts that these agencies place with minority firms.

Publications of Superfund Participation: EPA has issued a number of publications of interest to minority contractors, including:

- *The New Superfund -- What It Is, How It Works*, August 1987;
- *Superfund* [WH/FS-87-001R], Fall 1987;
- *The Superfund Remedial Program* [WH/FS-86-002R], Fall 1987;
- *The Superfund Removal Program* [WH/FS-86-003R], Fall 1987;
- *Public Involvement in the Superfund Program* [WH/FS-86-004R]; Fall 1987;
- *Identifying Superfund Sites National Priorities List (NPL) and Hazard Ranking System (HRS)* [WH-FS-86-005R], Fall 1987;
- *Environmental Response Team* [HW 2], April 1984;

- *Minority Firm Participation for Superfund Contracting*, Fiscal Year 1988;
- *The Superfund Enforcement Process: How It Works*, Summer 1988;
- *State and Local Involvement in the Superfund Program* [WH/FS 88-009], Spring 1988; and
- *Superfund Innovative Technology Evaluation (SITE) Program*, November 1988.

The greatest dollar value of minority firm work on Superfund projects is represented by EPA's direct procurement. The types of services that minority firms provided through direct procurement can be categorized into three major areas: professional, field support, and construction. Typical services contracted or subcontracted to these minority firms are listed below:

Professional	*Field Support*	*Construction*
Health Assessment	Drilling/Well	Site Clean-up
Community Relations	Installation	Excavations
Feasibility Studies	Laboratory Analysis	Waste Hauling Disposal
Data Management		Security
Geophysical Surveys		Site Support Facilities
Remedial Investigations		
Expert Witness		
Editing		
Air Quality		
Monitoring		

CERCLA Cooperative Agreements: Cooperative agreements (CAs) are contractual arrangements between EPA and state government agencies, local governments, and Indian Tribes that enable EPA to involve these non-Federal governments in response activities at Superfund sites within their jurisdiction. CAs specify work to be performed and the funding allocated for the work. Funding is on a shared basis. Governments with CAs may establish more specific subagreements, provided that such subagreements are for procurement activity. Each subagreement, however, must have a negotiated "Fair Share" objective for minority business participation. EPA and the state may agree to negotiate an overall "Fair Share" objective for total state projects for a fiscal year, or they may negotiate individual "Fair Share" objectives on a site-by-site basis. In either event, minority businesses must be given the opportunity to participate and the governmental agencies must carry out the affirmative steps specified in EPA Regulations to maximize minority business participation. In FY88, EPA awarded 213 CAs amounting to $124,934,404. The CAs were either new requirements, continuations, augmentations (increases), or revisions. The states awarded 25 subagreements to minority contractors with a potential value of $41,459,225.

EPA Interagency Agreements: Interagency agreements (IAGs) are similar to cooperative agreements, except that they are negotiated between EPA and other federal agencies that perform functions related to Superfund work such as the U.S. Army Corps of Engineers. These agencies use their own procurement methods when entering into contracts for services to be provided in accordance with the IAG. Interagency transfers of Superfund monies amounted to 174 transactions for a sum total of $172,048,292. Like the CAs, the IAGs were for either new requirements, continuations, augmentations, or revisions. Federal agencies awarded eight procurement actions to minority contractors for a total of $1,447,779.

As mentioned previously, EPA is planning to meet with federal agencies who receive the bulk of IAG monies from Superfund. In FY88, the Corps received $46,899,785 under Superfund IAGs. Of this amount, the Corps placed one contract worth $68,000 with a minority firm. EPA will attempt to find ways in which agencies, such as the Corps, can increase their utilization of minority firms in their contracting operations for Superfund.

EPA Direct Procurement: EPA direct procurement resulted in by far the largest dollar volume that was placed with minority firms in FY88. The Superfund Program awarded a total of 3,947 contracts during the fiscal year, the total amount of dollars placed under these contracts was $613.3 million. Of this total, minority awards were made as follows:

Type of Contractor	Number	Total Dollars (in millions)
Minority Prime Contracts	38	$ 7.4
SBA 8(a) Contracts	349	$21.8
Minority Subcontracts	103	$ 9.8

Total minority contracting was $39 million or 6.3 percent of the total dollars obligated for Superfund in FY88. Not included in these totals was a contract using Superfund monies awarded to the NAMC, in the amount of $500,000. These dollars are not included in the above totals since NAMC is a non-profit organization.

11.0 TECHNOLOGY-RELATED RESEARCH AND DEVELOPMENT

11.1 Overview

Section 301(h)(1)(D) of CERCLA requires the Administrator of EPA to submit as part of the Report to Congress an evaluation of newly developed feasible and achievable permanent treatment technologies. SARA emphasized selecting remedies that, in addition to being protective of human health and the environment and cost-effective, utilize permanent solutions and alternative treatment technologies, or recovery technologies to the maximum extent practicable. Remedy selection decisions should also take into account the statutory preference for remedies that employ treatment that permanently and significantly reduces the toxicity, mobility, or volume of hazardous substances as their principal element. The Superfund research and development program has the responsibility of developing innovative technologies that can help EPA meet the statutory requirements and preferences for remedy selection.

The Superfund technology development and evaluation program is divided into two major areas: the development and performance of unproven treatment technologies, and the Superfund Innovative Technology Evaluation (SITE) Program. The first area evaluates the performance of unproven treatment technologies developed by EPA and the private sector, and develops treatment technologies to the proof-of-concept stage, so that through the SITE Program and application of the technology transfer program, the private sector can make the technology commercially available. The overall goal of the SITE Program is to maximize the use of alternative technologies in cleaning up Superfund sites and to encourage the development and demonstration of new, innovative technologies.

The treatment technology research program emphasizes the development of new and innovative treatment technologies to either the pilot-scale or proof-of-concept stage in preparation for full-scale field demonstrations. Through the program, staff evaluate the cost and performance of available treatment technology when there is low commercial interest, low potential for profit, or high economic risk associated with development of the technology.

The evaluation of treatment technologies is to indicate areas where research advanced in FY88, including *in-situ* extraction, *in-situ* degradation or detoxification, *in-situ* immobilization, and best demonstrated available technology (BDAT).

During the fiscal year, the SITE program continued its work with the demonstration of new measuring and monitoring technologies to assist in Superfund site characterization. The SITE technology demonstration program distributed a new round of solicitations to the private sector for proposals to develop and demonstrate new technologies applicable to most or all steps of site cleanup. Also, SITE's technology transfer program expanded its efforts to communicate SITE information to all members of the public.

EPA's search for better cleanup technologies extended to overseas developments in FY88. Site visits to cleanup projects in Europe yielded valuable information concerning directions taken and progress made in hazardous site investigation and remediation activities.

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The Agency also has encouraged research to support the Superfund program at higher institutions of learning. The Superfund Research Grants program funds development of new biological and chemical cleanup approaches. Designated university hazardous substance research centers study problems relating to the generation, transportation, and disposal of hazardous and toxic wastes.

Finally, through the Superfund Technology Support Project (TSP), the Agency provided more resources, including technology experts, to assist field staff who are directly responsible for the management and cleanup of toxic waste sites. TSP also includes better training and career enrichment for RPMs and OSCs, the professionals most responsible for overseeing actual day-to-day operations at Superfund sites.

11.2 The Superfund Innovative Technology Evaluation Program

Section 209(b) of SARA amends Title III of CERCLA by adding Section 311(b), that directs the Agency to establish an "Alternative and Innovative Technology Research and Demonstration Program." This Congressional mandate codified EPA's existing SITE program that was created the year before. The SITE program is intended to accelerate the development, demonstration, and use of new or innovative treatment technologies and to demonstrate and evaluate new or innovative measurement and monitoring technologies. Section 311 of CERCLA requires an annual progress report (at the time of the annual budget submission) on the demonstration program being carried out by the Agency. EPA submitted its first SITE report to Congress in 1988.

There are five components to the Agency's SITE program:

- The demonstration program;
- The Emerging Technologies program;
- The Innovative Development and Evaluation program;
- The Measurement and Monitoring Techniques Development program; and
- The Technology Transfer/Clearinghouse program.

A detailed description of the SITE program will be presented in the annual SITE Program and Accomplishments Report.

11.2.1 The Demonstration Program

The purpose of the demonstration and evaluation of selected technologies under the SITE demonstration program is to develop data on performance, cost-effectiveness, and reliability so that Superfund decisionmakers can make sound judgments about the applicability of a technology to a particular site. The results of the demonstration should identify the limitations of the technology, the wastes and media to which it can be applied, the operating procedures, and the approximate capital and operating costs. The demonstrations should be carried out at full-scale, or at a scale that allows valid comparison and direct scale-up to commercial size units. The duration of the demonstration is determined on a case-by-case basis, but it must be of a sufficient length to adequately characterize equipment reliability and operational variabilities.

SITE demonstrations are usually conducted at actual uncontrolled hazardous waste sites, including Superfund sites. Occasionally, demonstrations are conducted at EPA-operated test and evaluation (T&E) facilities. At these T&E facilities, technologies can be evaluated over a wide range of operation without releasing pollutants outside the facility. The tests are conducted in these facilities using synthetic wastes and wastes brought in from actual hazardous waste sites.

Under the demonstration program, EPA and the developer of the technology share the cost of funding technology demonstrations. The technology developer pays the costs of erecting and operating the equipment onsite and of dismantling and removing the equipment at the end of the demonstration. EPA pays for the costs of sampling and analysis, quality assurance and quality control, evaluating data, and preparing reports. EPA may also help the developer obtain any required permits. At the completion of a successful demonstration, EPA will undertake activities to encourage wide-scale use of the technology in the Superfund program.

EPA issued a third request for projects under the SITE demonstration program in January 1988. From applications received, EPA accepted 10 technologies, bringing the total number of accepted technologies under the demonstration program to 29. Exhibit 11.2-1 lists these 10 accepted technologies and their developers, along with an anticipated demonstration completion date where available. EPA issued a fourth request for projects under the demonstration program in January 1989.

Also in FY88, six field demonstrations were completed for new technologies under the demonstration program. These demonstrations included infrared incineration, solidification, *in situ* vacuum extraction, oxygen-enhanced incineration, and solvent extraction.

11.2.2 The Emerging Technologies Program

The goal of the Emerging Technologies program (ETP) is to ensure that a steady stream of more permanent cost-effective technologies will be ready for demonstration in the field, thereby increasing the number of alternatives available for use in Superfund removal and remedial actions. EPA initiated ETP in FY88 by soliciting pre-proposals to further develop and test (at pilot-scale) technologies that had been proven at bench-scale or laboratory-scale. The Agency received a total of 84 pre-proposals from this solicitation. EPA invited 15 of those who had submitted pre-proposals to submit cooperative agreement applications to EPA's Grants Administration Division. EPA received 12 cooperative agreement applications and selected seven for funding. Exhibit 11.2-2 lists the seven participants and the ETP technologies. Four of these technologies involve aqueous treatment of metals or organics and three involve soils treatment of metals or organics.

EPA issued a second ETP solicitation in the summer of 1988. The emphasis in this solicitation was on the treatment of complex mixtures of pollutants (organics and inorganics) in soils and sludges. EPA will award six to eight

Exhibit 11.2-1

Technologies Accepted Under the Site Demonstration Program for Fiscal 1988

Developer	Technology	Demonstration Completed (Anticipated)
Biotrol, Inc. Chaska, MN	Soil Washing	(Spring 1989)
Biotrol, Inc. Chaska, MN	Biological Degradation	(Spring 1989)
CBI Freeze Plainfield, IL	Separation By Freezing	
Chemical Waste Management, Inc. Riverdale, IL	Low-Temperature Desorption	
Detox, Inc. Dayton, OH	Fixed-Film Biological	
E.I. DuPont de Nemours, Inc. Newark, DE	Microfiltration	
Freeze Technologies Corp. Raleigh, NC	Separation By Freezing	
Silicate Technology Corp. Scottsdale, AZ	Pozzolonic/ Silicate Based	(Spring 1989)
Toxic Treatments, Inc. San Mateo, CA	*In situ* Steam/ Air Stripping	(February 1989)
Ultrox International, Inc. Santa Anna, CA	Ultra-violet Radiation and Ozone	(March 1989)

SOURCE: OSWER Annual Report: Fiscal Year 1988, OSWER, November 1988.

Exhibit 11.2-2

Emerging Technologies Program Participants

Developer	Technology
Atomic Energy of Canada Limited Research, Inc. Chalk River, Ontario	Ultrafiltration
Battelle Memorial Institute, Columbus Division Columbus, OH	*In situ* Electroacoustic Decontamination
Bio-Recovery Systems, Inc. Las Cruces, NM	Biological Sorbtion
Colorado School of Mines Golden, CO	Wetlands-Based Treatment
Energy and Environmental Engineering, Inc. Somerville, MA	Laser Stimulated Photochemical Oxidation
Envirite Field Services, Inc. Atlanta, GA	Solvent Washing
Western Research Institute Laramie, WY	Contained Oil Recovery of Wastes

SOURCE: OSWER Annual Report: Fiscal Year 1988, OSWER, November 1988.

cooperative agreements under this solicitation, depending on the level of funding requested by the cooperative agreement applicants.

11.2.3 Innovative Development and Evaluation Program

The purpose of the SITE Innovative Development and Evaluation program is to test, evaluate, and demonstrate promising technologies that can be used to clean up uncontrolled hazardous waste sites. These are technologies that have been developed under the Office of Research and Development's (ORD) basic engineering research program and that show potential for commercial use. Currently, ORD is developing technologies at bench-, laboratory-, and pilot-scale level for use at Superfund sites. Full-scale and pilot-scale evaluations of promising technologies will take place at actual Superfund sites or at EPA Test and Evaluation Facilities. Activities scheduled under the Innovative Development and Evaluation program for FY89 include:

- Demonstration of a mobile carbon regenerator that will detoxify and regenerate contaminated carbon and provide a safe and effective method for handling contaminated carbon;
- Demonstration of a mobile soils washer that will separate contaminants from soil by high energy mixing of soils and solvents, additives, surfactants, acids, and bases; and
- Field testing of potassium polyethylene glycolate (KPEG) technology, which is an effective dehalogenator of aromatic and aliphatic organic materials, including PCBs and other toxic halides.

11.2.4 Measurement and Monitoring Technologies Development Program

Another component of the SITE program is the development and demonstration of new and innovative measurement and monitoring technologies that will be applicable to Superfund site characterization. The Management and Monitoring Technologies Development program has four major goals:

- To assess the extent of contamination at a site;
- To supply data and information to determine the effect on human health and the environment;
- To supply data to select appropriate remedial action; and
- To monitor the success or effectiveness of the selected remedy.

Under this program, EPA's Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, (EMSL-LV) supports the development of improved measurement and monitoring techniques in conjunction with the SITE program. EMSL-LV's research and development focuses on two areas of monitoring and measurement technology: immunoassays for toxic substances and fiber optic sensing for *in situ* analysis at Superfund sites. In FY88, EMSL-LV continued its work on developing these two monitoring and measurement technologies.

11.2.5 Technology Transfer/Clearinghouse Program

Recognizing that access to treatment information is essential to the acceptance and use of alternative technologies, the SITE program developed a Technology Transfer/Clearinghouse program that collects, synthesizes, and disseminates technology performance data. Originally only a clearinghouse for SITE program projects, the Technology Transfer/Clearinghouse program is evolving into a center that houses a variety of information on existing, as well as emerging, hazardous waste treatment technologies.

The clearinghouse has three components:

- A hotline to provide callers with information on remedial technologies;

- An electronic bulletin board system (BBS) that fosters communication and technology transfer among Regional and EPA Headquarters staff who are involved in solid or hazardous waste regulation, permitting, or enforcement; (ORD scientists and engineers at Headquarters and laboratories, which are supporting OSWER, also can use BBS. The BBS is designed to be easy to operate and readily accessible from anywhere in the country. It is a forum for technical interchange at the working level that enables staff members to establish and maintain contacts with counterparts in other Regions, offices, and laboratories.); and
- A collection of reports, journals, and other documents housed in the EPA library's Hazardous Waste Collection. (This collection is available at EPA's ten Regional and five laboratory libraries. The bibliographic data base is accessible using a personal computer.)

In FY88, the Technology Transfer/Clearinghouse program developed a centralized data base to assist OSCs and RPMs in answering questions about available hazardous waste technologies appropriate for remediation at sites for which they are or will be responsible.

11.3 International Survey of Treatment Technologies

To ensure that Superfund sites are addressed using the best technology available world-wide, EPA completed an international survey of treatment technologies. The purpose of the survey was to identify and assess internationally-used treatment technologies that are applicable to hazardous site remediation in the United States.

In Phase I of the survey, EPA identified 95 treatment technologies. Fifteen of these technologies were selected for further study in Phase II of the survey. Belgium, the Federal Republic of Germany, and the Netherlands are employing especially promising technologies, including:

- Soil washing;
- Biological treatment;
- High temperature slagging incineration; and
- *In situ* vacuum extraction of volatile organic compounds (also well-known in the United States).

A complete description of the results of the International Survey is contained in *Assessment of International Technologies for Superfund Applications* (September 1988, EPA/540/2-88/003).

11.4 Research Grants/University Hazardous Substance Research Centers

EPA conducts several programs with the nation's universities to research topics related to Superfund site assessment and cleanup. The University

Research Grants program, established in FY87 continued its work in FY88. Applications were solicited in March 1988 for "innovative, cost-effective methods for the treatment of hazardous wastes *in situ* at Superfund sites". In response to this solicitation, EPA received 26 applications and funded eight, following external peer review.

Section 311(d) of CERCLA authorizes $5 million annually for EPA to establish at least five, but not more than ten, university hazardous substance research centers (HSRCs) around the country. The Agency's FY88 appropriation included $5 million for this program, provided that no more than five centers be established, and that these centers be competitively selected. The HSRCs are required to conduct long-term and short-term research, as well as providing training and technology transfer relating to problems associated with the manufacture, use, transportation, disposal, and management of hazardous substances.

11.4.1 University Research Grants Program

The following is a representative sample of the kinds of University Research Grants program projects that EPA funded:

- More effective anion-exchange resins to remove toxic contaminants in ground water at Superfund sites;
- Enhanced microbial degradation of hydrophobic organic contaminants at sites;
- Use of enzymes from genetically engineered micro-organisms to dechlorinate PCB in soils at Superfund sites; and
- Development of a portable, fixed-film decontamination unit to enhance biodegradation of contaminants in ground water.

Funding for these projects totals $1.42 million, to be disbursed over a two-year period. EPA used an additional $0.85 million to fund continuations of grants awarded during the previous two years.

11.4.2 University Hazardous Substance Research Centers

EPA published a solicitation for proposals for HSRCs on March 22, 1988. To ensure equitable geographic distribution of these centers, the Agency partitioned the country into five "region-pairs" and will establish one HSRC in each region-pair. Each HSRC must focus its research on problems of particular concern to the states in its region-pair. The following region-pairs were established:

- Regions 1 and 2 (New England, New York, New Jersey, Puerto Rico, and the Virgin Islands);
- Regions 3 and 5 (the mid-Atlantic and the Great Lakes States);
- Regions 4 and 6 (the South and Gulf Coast States);

- Regions 7 and 8 (the plains and Rocky Mountain States); and
- Regions 9 and 10 (the Pacific Coast States, Arizona, Nevada, Idaho, Alaska, Hawaii, and Guam).

The deadline for submission of proposals was June 27, 1988.

EPA received proposals from 33 institutions or consortiums, representing 95 colleges and universities. Five panels consisting of at least 10 scientific and technical experts from outside the federal government reviewed the proposals. These five panels will make their recommendations for funding to EPA's Assistant Administrator for Research and Development, who will be the final decision official. EPA will invite the chosen institutions to submit formal applications for assistance. These applications should be received, processed, approved, and funded in FY89.

11.5 Technology Support Project

In response to an increasing need to manage hazardous waste problems with the most effective support systems available, and in response to Congressional and General Accounting Office (GAO) recommendations, OSWER and ORD began to work jointly to develop a comprehensive approach to technical management of Superfund sites. EPA initiated such a program in FY87: the Superfund Technology Support Project. The project was designed to provide EPA personnel, state Superfund organizations, PRPs, and the public with technical assistance, demonstration, training, and information about the best demonstrated technologies for application at Superfund sites, as rapidly as possible. In FY88, TSP assisted field management personnel with a network of numerous resources in both OSWER and ORD.

The TSP includes four ORD Superfund Technology Support Centers, which will provide RPMs and OSCs in the field with:

- A technology transfer/information clearinghouse;

- Career enhancement and development;
- Site technical reviews;
- Contractor assistance; and
- High-technology demonstration/training.

These four Technology Support Centers are located at ORD laboratories in Las Vegas, Nevada, Cincinnati, Ohio, Athens, Georgia, and Ada, Oklahoma. The activities that EPA initiated in the first two areas of the TSP in FY88 are described below.

11.5.1 Technology Transfer/Information Clearinghouse

As an example of the Agency's efforts to transfer technological information to field managers, the Office of Program Management and Technology (OPMT) in OSWER has been developing a new analytical ground-water computer system. The objective has been to develop a computer workstation that combines commercially available geologic interpretation software with field data. The resulting workstation will provide lucid graphics, more efficient information storage, and data interpretive aids for analyzing ground-water problems. It is OSWER's intention to provide one complete workstation, including training and continuous technical support, for RCRA and CERCLA program use in each Region.

Four Regions have had computer workstations since October 1987. The workstations have been undergoing a series of debugging and trial runs and OSWER now believes that the system has been adequately refined for installation in the remaining Regions. Success in each of the Regional offices will depend upon the cooperation of all personnel and will be measured by: (1) effective installation, training, and staff use; and (2) a nationwide network of system users that can begin to share expertise and contribute to the evolution of the system for improved ground-water analyses.

11.5.2 Career Enhancement and Development

In 1987, the Agency began to address the importance of the need for full career development for personnel in the critical positions of OSC and RPM. Congress and the General Accounting Office (GAO) also identified the need to address Superfund workforce and staffing problems. A GAO report to Congress in October 1987 identified several Superfund problem areas related to human resource management: staffing and skill shortages, employee turnover, pay differentials, and Superfund training.

OERR and OPMT, with the assistance of the Office of Human Resources Management (OHRM) and the Regions, have taken significant steps in FY88 to address these Superfund issues. They have designed the OSC/RPM Support program to improve the ability of OSCs and RPMs to perform their jobs efficiently and effectively, and to provide OSCs, RPMs, and others involved in hazardous materials cleanup with opportunities to grow professionally.

12.0 HEALTH-RELATED RESEARCH AND DEVELOPMENT

12.1 Overview

CERCLA authorizes significant new health-related research programs in both EPA and the Department of Health and Human Services (HHS). Although the amended statute does not clearly differentiate among research areas and agencies in the health research area, a broad research agreement was reached between the two agencies in FY87 on the scope of each research program. The EPA program will focus on the development and evaluation of toxicological test methods, exposure assessment methodology, and risk assessment and characterization techniques. The Agency for Toxic Substances and Disease Registry (ATSDR) will conduct research related to its health assessment responsibilities under CERCLA. The National Institute of Environmental Health Sciences (NIEHS) will support multidisciplinary biomedical research through grants to universities.

12.2 EPA Health-Related Research Program

The overall objective of EPA's health-related research program is to improve scientific capability for detecting, assessing, and evaluating the effects on and risks to human health from hazardous substances, as needed for Superfund removal and remedial cleanup decisions. The EPA research program has been developed cooperatively within ORD and between ORD and OSWER. Research conducted under this program commenced in previous years and continued throughout FY88.

12.2.1 Health Effects, Risk Assessment, and Detection Research

The health-related research program has several components that are organized conceptually in a matrix. Three of these components correspond to OERR's three steps in the public health evaluation process. They are:

- *Toxicity Assessment*. Key toxicity data will be developed for use in risk assessment, these include: rapid response toxicity testing and field screening of priority compounds; evaluation of the toxicity of incinerator and other treatment residues; evaluation of PCB carcinogenicity; and human reproductive risks from chemical mixtures. In FY88, research continued on a rapid response bioassay battery to determine the developmental toxicity, neurotoxicity, and general toxicity of site samples. Also, genetic activity profiles were prepared on the first 50 most hazardous substances found at Superfund sites. These profiles support the Toxicological Profile Development Process.

- *Exposure Assessment*. To improve the confidence and accuracy of human exposure estimates at CERCLA sites, this research and development will characterize parameters needed for exposure assessment, validate existing models, and develop approaches for assessing multimedia exposure and integrating exposure assessments.

- *Risk Characterization.* Methods for characterizing health risks and environmental effects of chemical mixtures will be developed and assistance will be provided to Superfund site risk assessment.

The other components of the Agency's research program correspond to major research themes of priority interest to ORD and OERR:

- *Internal Dosimetry.* To better predict delivered dose, two areas of research will be emphasized:

  1. **Pharmacokinetics.** This research will predict the bioavailability of chemicals more accurately in the following ways: defining rates of inhalation, and skin and oral absorption; characterizing pharmacokinetic parameters of uptake, distribution, and metabolism; developing physiologically based pharmacokinetic models for multiple routes of exposure and for multiple compounds; and identifying sensitive subpopulations.

  2. **Biomarkers of Exposure and Effect.** This initiative will focus on better methods for measuring dose through different biologic assays, including a variety of somatic (mutagenicity) and germinal markers (sperm measures) as well as the application of markers to epidemiologic methodologies to improve sensitivity and specificity for human disease endpoints. In FY88, the structure of the baboon lung was compared to that of a human. This work will assist in modelling uptake and distribution of hazardous substances in the human lung.

- *Chemical Mixtures.* Focus of the research will be on developing toxicological models to predict interactions, identification of classes of contaminants that may yield additive, synergistic, or antagonistic responses, and statistical methods for analyzing high-dimensional data sets. In FY88, research continued on efforts to establish dose-response relationships and on the elucidating mechanism of interactive effects with chemical mixtures. The initial focus of this research was on acute liver injury.

- *Noncancer Health Effects.* Reproductive toxicity is a critical endpoint of interest for OERR and will be the initial focus of this research. Research will develop sensitive test methods for detecting effects on male and female reproductive systems and biological markers as early indicators of exposure to chemical mixtures. Additional emphasis is being placed on neurotoxic endpoints with development of new and more sensitive *in vitro* and *in vivo* endpoints. In FY88, various *in vitro* systems were investigated for their utility in screening hazardous substances for neurotoxicity. The study concluded that these methods are not yet sufficiently advanced for this use.

The research projects described above are two to five years in length; however, progress reports will be prepared or program reviews will be conducted annually.

12.2.2 Toxics Integration Branch

In FY87, the Toxics Integration Branch (TIB) was created within OERR to focus OERR's health and risk assessment activities within one branch. TIB is the point of contact at EPA for ATSDR. TIB is responsible for determining OERR health research needs, developing policy and guidance documents for conducting health assessments and risk assessments at Superfund sites, and for providing training and assistance to Regional offices on health and risk assessments.

For example, TIB is responsible for the following specific activities and projects:

- Revising and updating the *Superfund Public Health Evaluation Manual* (SPHEM) and developing associated training;
- Ensuring increased efficiency and automation of risk assessment procedures;
- Providing technical information and assistance to Regional offices, including Agency data on chemicals, and information on health and risk assessment documents and of risk assessment reviews;
- Ensuring that OSWER policies on risk assessment are internally consistent and follow Agency policy;
- Determining and tracking OERR health research funding needs; and
- Coordinating OERR interaction with ATSDR.

In FY88, TIB worked to develop better "tools" for the performance of Regional site risk assessments, improved policy guidance for conducting and reviewing risk assessments, and placed an increased emphasis on user needs in the Superfund health-related research program. TIB and the Health Sciences Section of OWPE jointly established a formal quality assurance program that is intended to provide technical assistance on the most difficult Regional risk-related issues and to identify inconsistencies in methods and assumptions. Under this program, each Region was requested to submit two representative Superfund risk assessments each year for Headquarters review. In addition, TIB instituted an electronic mail box to receive questions from the Regions on risk assessment and is currently using the OSWER electronic bulletin board to disseminate chemical-specific risk information to the Regions.

The primary source of Superfund risk assessment guidance is the SPHEM. In FY88, TIB established a broad-based workgroup to revise this manual. The workgroup identified major concerns and issues through interviews with Regional and Headquarters program staff, state risk assessors, federal facilities personnel, ATSDR, and contractor staff. The first draft of the revised manual is currently being prepared and is expected to be completed in 1989. A final version of the revised manual should be published sometime in the summer of 1989.

TIB also completed and is distributing the final version of the *Superfund Exposure Assessment Manual*. This document provides detailed guidance on the use of exposure assessment models and information on the public health evaluation process. In addition, in FY88, TIB distributed to the Regions and states two completed revisions to the *Public Health Risk Evaluation Data Base* (PHRED). This PC-based tool updates the information found in the appendices to the SPHEM.

12.3 The Agency for Toxic Substances and Disease Registry

CERCLA mandates that ATSDR perform specific public health activities associated with actual or potential exposure to toxic substances identified at hazardous waste sites. The ATSDR research program focuses on assessing the relationship between exposure to toxic substances and the resulting human health effects, and also on effective ways to inform the public of health risks.

Section 104(i)(6) of CERCLA requires that ATSDR perform a health assessment for each facility listed on the NPL. By December 10, 1988, ATSDR must complete these health assessments for all facilities listed or proposed for listing on the NPL by October 17, 1986. For facilities proposed for listing after October 17, 1986, ATSDR must complete health assessments within one year of the date of proposal for inclusion on the NPL. This section directs ATSDR to consider NPL schedules and EPA's schedules for conducting RI/FSs when establishing priorities for health assessments.

A health assessment is the evaluation of data and information about the release of toxic substances into the environment. It assesses any current or future impact on public health, develops health advisories or other health recommendations, and identifies studies or actions needed to evaluate and mitigate or prevent human health effects. In FY88, ATSDR entered into cooperative agreements with 16 states to perform health assessments at sites located in these states. ATSDR also conducted training sessions on conducting health assessments for personnel from these states. TIB staff participated in these training sessions to ensure that state personnel understood the Superfund process and their role in it.

ATSDR also issued preliminary guidance on conducting health assessments during the fiscal year. This preliminary guidance contains a uniform format for the presentation of health assessments and closely follows the SPHEM, using most of the same reference sources. TIB and the Office of Waste Programs Enforcement (OWPE) have provided ATSDR with comments on the health assessment guidance.

In addition, EPA and ATSDR have agreed to a process for EPA review of draft ATSDR health assessments. This agreement calls for the signature of Branch Chief (or equivalent, depending upon the EPA Region) on all EPA comments on the final draft of a health assessment. These comments will be submitted to the Associate Director of ATSDR's Health Assessment Office. If issues that cannot be resolved at this level arise over a specific health assessment, the EPA Regional Branch chief may ask ATSDR not to finalize the health assessment until a discussion of the issues can take place at a higher level. The agreement provides for extensive communication at the staff and mid-management level, with higher-level involvement required only in extremely controversial cases.

Section 104(i)(2) of CERCLA requires EPA and ATSDR to develop a list of 100 hazardous substances commonly found at NPL sites that pose significant human health risks. The deadline for preparing this list was April 17, 1987. This section also requires these two agencies to revise the original list by October 17, 1988, and to add another 100 hazardous substances to the list.

Section 104(i)(3) requires ATSDR to perform toxicological profiles of each of the listed substances. These toxicological profiles must be completed at a rate of 25 per year for the first 100 substances. Profiles of the second 100 substances on the list must be completed within three years after their addition to the list. A toxicological profile of a substance involves an analysis of available toxicological and epidemiological data to determine health effects from exposure to the substance. The profile will determine if there is adequate data to set levels of exposure that cause health risks, and if not, it will identify toxicological tests necessary to determine that level.

ATSDR and EPA compiled a list of the first 100 priority hazardous substances and published a *Federal Register* notice (April 17, 1987) proposing guidelines for developing the first 25 toxicological profiles. In FY88, EPA and ATSDR revised the list to include an additional 100 priority hazardous substances. These substances were added to the list using data from the Contract Laboratory Program (CLP), NPL listings, and reportable quantities information.

Also in FY88, ATSDR completed toxicological profiles of 14 of the first 25 substances on the priority list. The remaining 11 profiles have been through public comment and are currently being finalized. ATSDR drafted toxicological profiles of the second group of 25 substances and sent them to EPA Regional offices for review in December 1988.

EPA and ATSDR established a mid-level management "steering committee" in FY88. This committee meets four times each year to discuss interagency progress concerns and to resolve site-related problems that could affect ATSDR and EPA personnel. This committee functions at the Branch Chief and staff level. An ATSDR representative and an EPA Regional representative serve on the committee. At the end of each year, EPA will appoint a new Regional committee member.

12.4 The National Institute of Environmental Health Sciences

Section 311(a) of CERCLA authorizes a research program at NIEHS to develop advanced techniques for detection and evaluation of the effects on human health of hazardous substances. This section also authorizes research on methods to assess the risks to human health presented by hazardous substances, on methods and technologies to detect hazardous substances in the environment, and on basic biological, chemical, and physical methods to reduce the amount and toxicity of hazardous substances.

13.0 EXECUTIVE BRANCH ACTIONS TO IMPLEMENT CERCLA

13.1 The National Response System

The National Contingency Plan (NCP) was developed to ensure that the resources and expertise of the federal government would be immediately available for those relatively rare but very serious oil and hazardous substance incidents that require a national or regional response. The NCP established a hierarchy of mechanisms that together form the National Response System. The hierarchy consists of:

- The National Response Team (NRT);
- The Regional Response Teams (RRTs);
- The On-Scene Coordinators (OSCs); and
- The National Response Center (NRC).

13.1.1 The National Response Center

The NRC acts as the national communication center, receiving reports and notifying the OSCs of incidents. If a release of oil or hazardous substances occurs that is greater than the legally specified quantity for the substance, the party responsible for the incident is required by law to notify the National Response Center (NRC). Between October 1987 and September 1988, the NRC received more than 16,000 notifications. The Center is funded by the Department of Transportation and EPA, and is staffed by Coast Guard officers and Marine Science technicians. The staff is trained to collect specific information from the people reporting incidents. The types of incidents reported include oil spills, derailed tank cars or overturned trucks leaking toxic gases, and fires and explosions that release hazardous substances. Designated hazardous substances were involved in 21 percent of the FY88 reports, oil and oil products in 49 percent, and other hazardous materials (such as natural gas and explosives) were involved in 30 percent.

When the reported incident involves an oil spill or a release of a hazardous substance, the Center notifies a predesignated On-Scene Coordinator (OSC) assigned to the area of the incident. The Center uses a variety of computer systems to locate information to assist the OSC. For example, the Oil and Hazardous Materials Technical Assistance Data Systems (OHMTADS) and the Chemical Hazard Response Information System (CHRIS) are used to identify chemicals when only partial information is available. Other systems help to predict the likely direction of a spill's movement. A marine transportation data base provides access to historical information on vessels, hazardous cargos, and parties who may be involved.

13.1.2 Regional Response Teams

The RRTs work with state governments to provide guidance and assistance within their regions. They ensure that, in an emergency, appropriate federal assistance will reach the scene quickly following an OSC request. During FY88, RRTs were activated for 40 incidents. These ranged from the January 2, 1988, Ashland oil spill into the Monogahela River to telephone notifications alerting RRT members that their assistance might be needed. In addition to the Ashland spill, the RRTs participated in responses to a 212,000 gallon oil spill in the Chesapeake Bay, a 990,000 gallon spill of carbon black feed stock oil into the Mississippi River, a pesticide fire in North Dakota, a 365,400 gallon oil spill in San Francisco Bay, and a 600,000 gallon oil spill in the Gulf of Alaska.

RRTs also conducted eight major simulation exercises of regional and OSC contingency plans to test federal response capabilities and to ensure that state and local response plans are compatible with the federal plans. One of the simulation exercises was conducted jointly with Canada. In addition, a team from the USSR observed a specially designed exercise in Alaska that lead to the development of a US/USSR joint contingency plan. In addition, RRT members assisted and participated in exercises conducted by states and observed exercises carried out by other groups.

There are 13 standing Regional Response Teams (RRTs), one for each of the ten federal Regions plus one each for the Caribbean, Oceania (Pacific Basin), and Alaska. RRT members include representatives from a number of federal agencies and from each state within the Region.

The RRT provides a scheduled forum within which federal agency field offices and states exchange information on their capabilities for response. During an incident, an RRT may be activated on-scene, or through conference calls. As necessary, RRT representatives from member agencies who have the technical expertise or contacts needed by the OSC establish an incident-specific RRT to provide technical advice or resources required at the scene of a release.

Each RRT has developed a regional contingency plan to ensure that in an actual incident, the response roles and responsibilities of the agencies and states are clear. The plan describes how all levels of government will respond and interact effectively if called upon in an emergency. The RRT reviews the reports of the OSCs to identify problems in the response capabilities of the Region, to revise the plan as needed, and to work with states. The RRTs also work with OSCs on OSC contingency plans for specific areas in EPA Regions. The simulation exercises described above test the regional and OSC contingency plans to ensure their effectiveness.

13.1.3 The National Response Team

The National Response Team (NRT) is a body of 14 federal agency representatives with expertise related to handling incidents. The NRT coordinates the activities of its 14 member agencies from the national to the regional level to ensure a unified federal approach on policy questions about national oil and hazardous substances response preparedness. Exhibit 13.1-1 lists the 14 federal agencies that have representatives in the NRT. A major influence on the NRT's FY88 activities were the requirements included in SARA. For example, the NRT helped EPA draft a revised Subpart B of the NCP that defines the organizational structure and responsibilities of the NRT, RRTs, OSCs and the NRC. The NRT also provided comments and review for EPA's revisions to other parts of the NCP. In addition, the NRT

Exhibit 13.1-1

National Response Team Members

Environmental Protection Agency

United States Coast Guard

Departments of Commerce

Department of the Interior

Department of Agriculture

Department of Defense

Department of State

Department of Justice

Department of the Treasury

Department of Health and Human Services

Department of Energy

Department of Labor

Federal Emergency Management Agency

Nuclear Regulatory Commission

SOURCE: National Response Team, Annual Report to Congress, 1988, March 1989.

- Began a review of member agencies' technical guidance on hazards analysis to develop a coordinated federal guidance document on the subject;
- Reviewed Mexican and Canadian joint contingency plans developed through negotiations between EPA and Mexico and the Coast Guard and Canada;
- Reviewed the development of a US/USSR joint contingency plan;
- Developed *Criteria for Review of Hazardous Materials Emergency Plans* (NRT-1A) to help RRTs review selected local emergency response plans required by SARA Title III;

- Appointed a computer applications committee that drafted a directory of federal information resources for emergency planning and response;
- Coordinated federal emergency preparedness and response training activities; and
- Continued to work to increase staffing support for RRTs.

The NRT does not respond directly to incidents, but provides assistance when requested during an incident. The NRT was not requested to assist in the response to any incident during FY88. The major areas of NRT activities are preparedness, training, international coordination, support of the RRTs, and management of the National Response System. The work of the NRT extends over longer periods of time than does the work of the more response-oriented NRC, OSCs, and RRTs. The NRT is primarily a planning and coordinating body.

13.2 Federal Facilities Program

Section 120 of CERCLA indicates that all provisions, guidelines, rules, regulations, and criteria contained in CERCLA apply to facilities owned and/or operated by the federal government. To focus attention on these federal facilities, and to implement the CERCLA requirements concerning them, EPA established the Federal Facilities Compliance Task Force in OWPE in 1987. In fiscal 1988, the Federal Facilities Compliance Task Force became a permanent office within OWPE, and is now known as the Federal Facilities Hazardous Waste Compliance Office.

The Federal Facilities Hazardous Waste Compliance Office works with EPA Headquarters, the Regional offices, and states to resolve issues concerning federal facilities. The goal of this office is to establish a nationally consistent enforcement program that recognizes and encourages the full use of EPA and state enforcement tools to ensure that federal facilities comply with CERCLA and RCRA requirements. The Federal Facilities Office focuses on the management of the federal agency docket, policy and guidance development, and compliance monitoring.

13.2.1 Federal Agency Hazardous Waste Compliance Docket

CERCLA section 120(c) requires EPA to establish a Federal Agency Hazardous Waste Compliance Docket. The purpose of the docket is three-fold:

- To identify federal facilities that may be contaminated with hazardous substances;
- To compile and maintain information submitted to EPA on these facilities under the provisions of CERCLA section 120(c); and
- To provide a mechanism to make this information available to the public.

The initial federal agency docket was published in the *Federal Register* on February 12, 1988, and listed 1,095 federal facilities. Of the total number of facilities on the docket, the Department of Defense owns and/or operates 594 facilities (54.25 percent) and the Department of Interior owns and/or operates 254 facilities (23.20 percent).

EPA is required to update the federal agency docket every six months. The first update to the docket was published in the *Federal Register* on November 16, 1988. (A notice providing editorial corrections to the first update was published in the *Federal Register* on December 7, 1988.) The first update contained technical corrections to the initial docket listing, including the deletion and addition of facilities to the initial docket.

The first update to the federal agency docket also included the addition of 105 new federal facilities. Exhibits 13.2-1 and 13.2-2 illustrate the numbers of new federal facilities added to the docket through this update by federal department and agency and by EPA Region, respectively. This addition of new federal facilities brings the total number of facilities that appears on the docket to 1,170.

The Federal Agency Hazardous Waste Compliance Docket is available for public inspection. In order to furnish information to the public regarding facilities contained in the docket, EPA established information repositories in all 10 of the EPA Regional offices. Information submitted by federal departments and agencies to EPA concerning facilities is included in the docket, and is organized and indexed according to a uniform system. This information is submitted by federal departments and agencies pursuant to CERCLA section 103 and under the permitting and activity notification provisions of RCRA sections 3005, 3010, and 3016.

13.2.2 Federal Facility Preliminary Assessments/Site Inspections

Executive Order No. 12580 delegates the responsibility for conducting PAs and SIs at federal facilities to the federal departments and agencies that own and/or operate those facilities. EPA has the responsibility to ensure that these activities are performed and that guidance and organized training workshops on conducting PA/SIs are provided for other federal departments and agencies.

The statutory deadline for the performance of PAs by federal departments and agencies at facilities listed on the initial federal agency docket was April 17, 1988. If a PA indicates that additional evaluation of the facility is necessary, the responsible federal department or agency must conduct an SI to provide EPA with all of the information necessary to perform a full HRS evaluation of the site. EPA will then propose the facility for inclusion on the NPL if it meets the established HRS scoring threshold. EPA has determined that PAs were not submitted for 108 federal facilities by the statutory deadline.

13.2.3 Federal Facilities Proposed for and Listed on the National Priorities List

On July 22, 1987, EPA added 32 federal facility sites to the NPL, the first federal facilities to be included on the list as final sites. The fifth update to the final NPL is scheduled to be published in 1989. It is expected that a

Exhibit 13.2-1

Federal Facilities Added to the Federal Agency Hazardous Waste Compliance Docket by the First Update

Department or Agency	Number of Facilities[1]	Approximate Percent of Total[2]
Defense	42	40.00
Air Force	*16*	
Army	*16*	
U.S. Army Corps of Engineers	*4*	
Navy	*5*	
Other Defense Agencies	*1*	
Interior (including Bureau of Land Management)	23	21.90
Agriculture	22	20.95
Energy	10	9.52
Transportation	3	2.86
National Aeronautics and Space Administration	2	1.90
Treasury	1	0.95
Small Business Administration	1	0.95
Tennessee Valley Authority	1	0.95
Total	105	100.00

NOTES : [1] The number of facilities may vary in subsequent listings because further information may change a facility's status.

[2] Percentages may not total 100 because of rounding.

SOURCE: 53 FR 46364, November 16, 1988.

Exhibit 13.2-2

Distribution by Region of Federal Facilities Added to the Federal Agency Hazardous Waste Compliance Docket by the First Update

Region	Number of Facilities[1]	Approximate Percent of Total[2]
1	2	1.90
2	5	4.76
3	6	5.71
4	4	3.81
5	7	6.67
6	31	29.52
7	9	8.57
8	12	11.43
9	14	13.33
10	15	14.29
Total	105	100.00

NOTES: [1] The number of facilities may vary in subsequent listings because further information may change a facility's status.

[2] Percentages may not total 100.00 because of rounding.

SOURCE: 53 FR 46364, November 16, 1988.

number of federal facility sites will be added to the final NPL through this update. In addition, one of the non-Federal facility sites that was previously listed on the NPL is expected to be classified as a federal facility in this update.

There are currently 30 additional federal facilities that have been proposed for the NPL. Fourteen of these federal facility sites were proposed for the NPL in fiscal 1988; the other sites were proposed prior to FY88. EPA also published a proposal to the NPL specifically for federal facility sites in July 1989.

13.2.4 Federal Real Property Transfer Regulations

CERCLA section 120(h)(1) requires that anytime the U.S. government sells real property on which a hazardous substance was released, disposed of, or stored for a year or more, the sales contract must include a notice that discloses the type and quantity of the hazardous substance and when it was on the property. Additionally, CERCLA section 120(h)(3) requires any U.S. department or agency transferring federally owned real property to include in the deed a covenant assuring the transferee that all remedial action necessary to protect human health and the environment was taken before the transfer, and also that any remedial action found to be necessary after the property is transferred will be conducted by the United States.

Section 120 also requires EPA to promulgate regulations on the form and manner of the notice to be put in sales contracts and deeds. Regulations were proposed by the Agency on January 13, 1988. Among the proposed rule's key provisions is the requirement that the contract notice contain: the hazardous substance's name and Chemical Abstracts Service Registry Number; the time of storage, disposal, or release; and the quantity stored, disposed of, or released. The Agency also proposed that the transfer of some single-family residences acquired through foreclosure by government agencies such as the Federal Housing Administration and Veterans Administration be exempted from the notice requirement. Property at which less than 1000 kilograms of hazardous substances were stored would also be exempt.

The final rule, with minor changes from the proposal is expected to be published in the *Federal Register* during 1990.

13.2.5 Federal Facility Agreements Under CERCLA Section 120

A Federal Facility Agreement (FFA) is a comprehensive document that addresses hazardous waste activities at a federal facility; it may include some or all phases of activity from the RI/FS through the implementation of the remedial action. FFAs formalize the procedure and timing for submittal and review of documents and establish a mechanism to resolve disputes. FFAs must comply with the public participation requirements of CERCLA section 117 and are enforceable by citizens and states through citizens suits. Additionally, CERCLA authorizes assessment of civil penalties by states and citizens against federal departments and agencies for failure to comply with FFAs. EPA is currently working with states and federal departments and agencies to negotiate and implement three-party FFAs for federal facilities listed on the NPL.

EPA Headquarters and the Departments of Defense and Energy agreed to model language for key provisions of a number of CERCLA FFAs in fiscal 1988. The model language deals with policy issues that required resolution before site-specific agreements could be finalized. The model provision topics include: title, jurisdiction, purpose, statutory compliance/RCRA-CERCLA integration, consultation with EPA, resolution of disputes, enforceability, stipulated penalties, extensions, *force majeure*, and funding. The EPA Regional offices will negotiate the site-specific provisions of agreements, notably those sections dealing with the actual work that needs to be performed and the schedules to be met.

The Agency has entered into four CERCLA FFAs with other federal departments and agencies. In November 1988, EPA and DOE reached an agreement in which DOE agreed to investigate and clean up contaminated ground water at its Lawrence Livermore National Laboratory in Livermore, California. In December 1988, EPA, DOE, and the State of Utah signed an agreement whereby DOE will clean up contamination at its Monticello, Utah facility, which was built in 1942 to produce vanadium. Also in December 1988, EPA and DOD signed two FFAs. The first agreement requires DOD to investigate and clean up Tucker Air Force Base in Oklahoma City, Oklahoma. The second EPA/DOD agreement requires the Army to conduct investigative and remedial activities at the Sacramento Army Ammunition

Depot in Sacramento, California. The Agency is currently negotiating agreements for the cleanup of waste sites at more than 20 other federal facilities around the country.

13.2.6 Report to Congress on EPA Responsibilities Under CERCLA Section 120(e)(5)

Section 120(e)(5) of CERCLA requires each federal department, agency, and instrumentality to furnish an annual report to the Congress concerning its progress in implementing CERCLA at its facilities. The report must include information concerning the following areas: progress in reaching interagency agreements (IAGs); cost estimates for each IAG; public comments on IAGs; progress in RI/FSs and RAs initiated at federal facilities on the NPL; and progress in RAs at non-NPL facilities.

EPA has 14 facilities subject to CERCLA section 102(e)(5) reporting requirements. This number differs slightly from the number of EPA facilities listed on the initial Federal Agency Hazardous Waste Compliance Docket due to changes in facility status that occurred after the original *Federal Register* notice was published. The first update to the federal agency docket did not add any EPA facilities to the docket. The 14 EPA facilities listed in the docket are identified in Exhibit 13.2-3.

The Occupational Health and Safety staff of EPA's Office of Administration and Resources Management is working to prepare the report on these EPA facilities. At present, these facilities are undergoing PAs; consequently, there are no RI/FSs or other remedial actions to report.

Exhibit 13.2-3

EPA Facilities on the Federal Agency Hazardous Waste Compliance Docket

	Facility/Location	Region
1.	Narragansett Environmental Research Laboratory, Narragansett, RI	1
2.	Environmental Services Division Laboratory, Edison, NJ	2
3.	Environmental Photographic Interpretation Center, Warrenton, VA	3
4.	Environmental Services Division Laboratory, Annapolis, MD	3
5.	Environmental Research Facility Gulf Breeze, FL	4
6.	Andrew W. Breidenbach Environmental Research Center, Cincinnati, OH	5
7.	Center Hill Hazardous Waste Engineering Research Laboratory, Cincinnati, OH	5
8.	Environmental Services Division Laboratory, Chicago, IL	5
9.	Testing and Evaluation Facility, Cincinnati, OH	5
10.	Combustion Research Facility, Jefferson, AR	6
11.	Environmental Services Division Laboratory, Kansas City, KS	7
12.	EPA Mobile Incinerator McDowell, KS	7
13.	National Enforcement Investigation Center, Denver, CO	8
14.	Environmental Services Division Laboratory, Manchester, WA	10

SOURCE: 53 FR 4280, February 12, 1988.

14.0 EXECUTIVE BRANCH ESTIMATE OF RESOURCES NEEDED TO COMPLETE SUPERFUND IMPLEMENTATION

14.1 Introduction

Section 301(h)(1)(G) of CERCLA requires EPA to estimate the resources needed by the federal government to complete Superfund implementation. The Agency interprets this requirement to mean the cost of completing CERCLA's implementation through the current authorization (FY91) and beyond. This chapter includes complete information through FY90. This material is presented in sections 14.1, 14.2, and 14.4 of this chapter. The resource estimates presented in these sections are divided between those needed by EPA and those needed by other federal departments and agencies. Data on resources beyond fiscal 1990 are in the early stages of development, as part of the fiscal 1991 budget. An estimate of the long-term costs of cleaning up the existing NPL is included, however, in section 14.3, together with an overview of the estimating method being used.

Congress provided EPA with $3,964,000,000 in budget authority for the implementation of CERCLA, as amended, for the three-year period of FY87 through FY89. The actual level of funds obligated annually may be slightly less than the level of budget authority provided. The budget authority funds are as follows:

1987	$1,411,000,000
1988	$1,128,000,000
1989	$1,425,000,000
TOTAL	$3,964,000,000

The resources estimate in this chapter is based primarily on the responsibilities and duties assigned to EPA and other federal departments and agencies by Executive Order 12580, some general assumptions about the overall size and cost of the Superfund program, and data submitted to EPA by the other federal departments and agencies. Estimates include assumptions about the size and scope of the Superfund program, the nature and number of response actions, participation by states and private parties, the increasing use of treatment technologies, and other factors. In the case of EPA, these assumptions relate to management of the workload already in the remedial pipeline, activities that are underway, or are actually in a planning stage. The estimate of resource needs beyond FY90 relies on many of the same cast factors and assumptions, but includes all of the activities that would be necessary to complete cleanups at the remaining inactive NPL sites.

In developing the resources estimate required by section 301(h)(1)(G), EPA has considered several sources:

- EPA Superfund budgets and budget estimates for FY88, FY89, and FY90, including budget requests from other federal departments and agencies;
- Data submitted to EPA by other federal departments and agencies under an approved General Services Administration

(GSA) Interagency Report Control Number (IRCN)*, issued on February 5, 1988, as required under the provisions of 41 CFR 201-45.6;

- The federal facilities docket developed under section 120(c) of CERCLA and each individual federal department's and agency's *Annual Report to Congress on Federal Facilities Implementation*, as required under section 120(a)(5) of CERCLA;
- EPA's Report to Congress entitled *Extent of the Hazardous Release Problem and Future Funding Needs* (December 1984), as required under section 301(a)(1)(C) of CERCLA;
- EPA's *Annual Report to the Office of Management and Budget on Pollution Abatement Needs at Federal Installations*, required under Executive Order 12088 and based on annual pollution abatement plans (A-106 reports) by federal departments and agencies; and
- Various EPA information systems, primarily the Financial Management System (FMS).

These sources will also be used for future Reports, but at the same time, the Agency is working to identify data requirements, improve data quality, develop cost estimating methods, and collect additional information. Specifically, EPA has completed a resources estimate for the balance of the current authorization, in the outyears of 1990 and 1991, and for the unfunded period beyond 1991. This long-term effort has been coordinated with the development of the 1991 budget. In conjunction with the proposal of the National Contingency Plan and its policies affecting program direction and scope, EPA is moving closer to a more complete implementation cost estimate. The initial results of this effort are presented in section 14.3 of this chapter.

EPA's ability to project the federal resources requirement for CERCLA implementation will improve with the publication of the final NCP and more experience implementing CERCLA as amended by SARA. Better coordination with other federal departments and agencies, and additional data on the implementation of the federal facilities requirement of section 120 will also help to improve the estimate.

14.2 EPA Estimate of Resources Necessary to Complete Superfund Implementation

In estimating the resource requirements for EPA to complete the implementation of CERCLA, the Agency typically focuses its projections on the expected costs of the remedial and removal programs in future years. These two programs are the major components of the Superfund program and account for the majority of Superfund expenditures by the Agency. The estimates of the resource needs for these two program areas are projected for FY89 and FY90.

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* Collection of other Federal department and agency resource requirement data is approved under GSA IRCN 0354 EPA -- Annual.

Developing a complete and accurate estimate of the costs to EPA for completing Superfund implementation is dependent on a number of factors, many of which could change in future years. The most important of these factors are:

- Changes in Superfund program policies and procedures because of the revised NCP, particularly the cleanup standards as required under section 121 of CERCLA;
- Changes in the remedial program because of revisions to the Hazard Ranking System, as required under section 105 of CERCLA;
- Changes in the character and size of the CERCLIS inventory and, as a consequence, the facilities that are added to the NPL;
- The effects of the long period required to identify, develop, select, and construct a remedy, particularly those using treatment technologies;
- The level of state Superfund program activity;
- The level of potentially responsible party participation in the program; and
- The nature of and demand for removal actions.

Superfund expenditures support EPA activities in three major areas: direct site support, program support, and site-related support. The proportion of Trust Fund resources allocated to each of these program areas may vary over time. Variations may be brought about by concentration of activity in certain program areas, changes in the focus of program implementation, and the maturity of the Superfund program. Other federal department and agency activities are also supported by resources from the Trust Fund.

Direct Site Support

Direct site support accounts for approximately 74 percent of total Superfund resources and funds:

- *Direct Site Work* (57 percent), which consists of:

  Removal actions,
  Remedial actions,
  Pre-remedial actions site assessments, and
  Engineering and design studies.

- *Site Support* (17 percent), which consists of:

  Extended remedial actions,

Community relations,
Contract laboratory support,
Contract management,
Enforcement,
PRP settlements, and
The Superfund Innovative Technology Evaluation program.

Program Support

Program support accounts for approximately 20 percent of total Superfund resources and supports:

- Siting capacity and community assistance grants, training, the Office of the Inspector General, and other miscellaneous activities (6 percent);
- Research and support for other federal departments and agencies (6 percent);
- Information management and policy/planning activities (3 percent); and
- General and financial administration (5 percent).

Site-Related Work

Site-Related Support accounts for approximately 6 percent of total Superfund resources and supports:

- Preliminary enforcement and cost recovery activities under section 107 of CERCLA (0.5 percent);
- National Response Team and Regional Response Team activities (0.8 percent); and
- Health studies and research, criminal casework, and other miscellaneous activities (4 percent).

PRPs contribute to the hazardous substance cleanup effort by undertaking and financing voluntary or enforced remedial activities, thereby reducing the number of remedial actions that require Superfund expenditures. EPA is currently developing and implementing policies designed to encourage PRP cleanups.

14.2.1 Remedial Program Costs

Remedial actions currently are the single largest category of Superfund expenditures and are expected to remain so in the future. To project EPA funding needs for the remedial program, several key factors must be estimated:

- The projected size of the NPL;

- The projected number of RI/FSs, remedial designs, and remedial actions undertaken;
- The average cost of an RI/FS, RD, and RA; and
- The direct cleanup actions taken by PRPs.

Exhibit 14.2-1 presents summary data on the actual and planned elements of EPA's Superfund actions. Exhibits 14.2-2 and 14.2-3 present data on EPA Superfund resource estimates in dollars and workyears, respectively.

14.2.2 Cost Recovery Revenues

In addition to the direct remedial and removal actions undertaken by PRPs, a portion of the costs of certain Fund-financed response actions will be recovered from PRPs through enforcement activities. The cost recovery revenues obtained from PRPs will ultimately reduce the overall costs of both the remedial and removal programs. In general, there is a three-year delay between expenditures from the Trust Fund for final site work and the reimbursement of these response costs by PRPs to EPA.

The cost recovery rate for remedial expenditures is subject to a range of possible estimates given varying assumptions about: (1) the probability of successful litigation; (2) the ability to recover interest costs from litigation; (3) how many NPL sites will be cleaned up by private parties without expenditures from the Trust Fund; and (4) the role of new CERCLA settlement provisions, such as mixed funding and *de minimis* settlements. To date, Fund-financed remedial action generally has been taken at sites where PRPs are potentially capable of taking cleanup responsibility. The cost recovery rate for these sites is likely to be relatively high. In future years, as the rate of successful EPA enforcement actions increases, more PRPs will directly undertake actual cleanups. As a result, more Fund-financed actions will be taken at sites where there is less likelihood of cost recovery because there are fewer PRPs connected with these sites. The cost recovery rate for these sites may be lower than the rate for the earlier sites.

14.2.3 Direct Clean-up Actions by Potentially Responsible Parties

Although the cost recovery revenues obtained from PRPs will reduce the costs of the removal and remedial programs, the available data for these revenues are not sufficient to allow for an accurate estimate of the percentage of Fund-financed removal costs and remedial costs that will be recovered from PRPs. The Agency is putting significant effort into improving its cost recovery performance, as is demonstrated by the FY87 and FY88 cost recovery amounts, the highest in the program's history.

14.3 Estimation of Resource Needs, Beyond Fiscal 1990, to Complete the Cleanup of the Existing National Priorities List

EPA has developed a tool to estimate the long-term resource needs of Superfund. The estimating approach provides meaningful long-range forecasts and is flexible enough to accommodate a wide range of possible programmatic conditions. The estimating approach uses a computer-based model which

Exhibit 14.2-1

Summary of EPA Superfund Actual/Planned Actions by Fiscal Year[1]

Activity	1987 Actual	1988 Actual	1989 Planned	1990 Planned
Removal Action Starts[2]	304	328	190	190
Pre-Remedial Actions				
PA Completions	4,001	2,884	2,500	2,500
SI Completions	1,343	1,237	1,325	1,325
NPL Additions[3]	99	229	75	75
Remedial Actions[4]				
RI/FS Starts	183	150	74	80
ROD Completions	75	152	160	160
RD Starts	94	99	168	195
RA Starts	54	72	119	130
Final RA Completions[5]	8	7	15	35
NPL Deletions[6]	0	5	8	15

NOTES:

[1] The data shown are for Trust Fund-financed actions and those undertaken by PRPs at NPL facilities/sites, except for removal actions. The numbers shown are by year and are not cumulative.

[2] NPL and non-NPL sites.

[3] NPL facilities/sites proposed for final listing on the NPL.

[4] Data are for both first and subsequent starts by Fund- and PRP-lead.

[5] Data represent completion of all construction work at sites.

[6] Data do not include sites proposed for deletion.

SOURCES: EPA Superfund Budget Documents.

incorporates many of the operational characteristics of Superfund and numerous points at which adjustments can be made.

Conceptually, the model uses several standardized activity sequences and related cost and FTE factors to estimate costs and schedules for new sites. This information is then combined with planning data on current sites and expected budget growth of program support elements to produce a comprehensive estimate of the cost to operate the Superfund Program.

Exhibit 14.2-2

EPA Superfund Funding Requirements By Fiscal Year[1]

(dollars in thousands)

Program Area	1987 Actual	1988 Actual	1989 Operating Plan	1990 Budget Request	1987-1990 Total
Direct Site Support	$ 851,106.6	$1,112,151.4	$1,094,806.6	$1,322,535.3	$4,380,589.9
Site Work	655,352.1	854.281.3	745.492.5	941,411.4	3,196,537.3
Removal Actions	*122,061.0*	*101,690.5*	*113,904.0*	*106,400.0*	*444,055.5*
Pre-Remedial Work	*36,341.0*	*42,790.0*	*47,250.0*	*48,875.0*	*175,256.0*
Engineering & Design Studies	*205,344.1*	*217,734.2*	*186,160.5*	*203,815.0*	*813,053.8*
Remedial Actions	*205,398.3*	*492,066.6*	*398,178.0*	*582,321.4*	*1,677,964.3*
Other	*86,207.7*	*0.0*	*0.0*	*0.0*	*86,207.7*
Site Support	195,754.5	257,870.1	349,314.1	381,113.9	1,184,052.6
Program Support	126,089.9	304,086.0	392,386.1	329,858.5	1,152,420.5
Site-Related Work	73,552.4	81,132.9	91,900.5	97,616.2	344,202.0
TOTAL SUPERFUND[1]	$1,050,748.9	$1,497,370.3	$1,579,093.2	$1,750,000.0	$5,877,212.4

NOTE: [1] Includes funds transferred to other Federal departments and agencies from the Hazardous Substance Superfund appropriation (Trust Fund) via: (1) the Superfund Interagency Budget (see Exhibit 14.3-1), and (2) site-specific IAGs. The costs shown here for remedial activities include first starts, subsequent starts, and work-in-progress. In setting mandatory schedules, such as that for remedial actions, Congress focused on first starts only (see CERCLA section 116(e)). On average, site work and support activities account for 74 percent of resources, program support activities are 20 percent of resources, and site-related activities are 6 percent.

SOURCES: EPA Superfund Budget Documents.

Exhibit 14.2-3

EPA Superfund Staffing Requirements in Workyears By Fiscal Year

Program Area[1]	1987 Actual	1988 Actual	1989 Current Estimate	1990 Budget Request
Hazardous Substance	1,056.8	1,186.5	1,281.7	1,343.5
Research	*93.4*	*94.0*	*102.8*	*106.8*
Response	*963.4*	*1,092.5*	*1,178.9*	*1,236.7*
Enforcement	764.5	928.4	991.7	1,079.2
Management and Support	353.0	482.9	509.3	567.8
Superfund Support		44.4	42.0	44.5
TOTAL	2,174.3	2,642.2	2,824.7	3,035.0

NOTE: [1] See section 9.1 for more information on the content of these EPA program areas.

SOURCE: EPA Superfund Budget Documents.

14.3.1 Estimated Cost to Complete Current National Priorities List Sites

The model has been used to produce an estimate of $18.6 billion as the cost to complete proposed and final sites on the existing NPL (Exhibit 14.3-1). Major considerations contributing to this estimate include:

- No new additions to the existing NPL which consists of both proposed and final sites;
- Five percent annual growth of Non-NPL Removals;
- Twenty percent annual decline in the number of NPL Removals and preremedial site starts;
- RA cost factors will follow a pattern similar to what occurred in FY87 and FY88;
- No annual growth for all program support and other agency elements (except those tied to site-related activities);

Exhibit 14.3-1

Estimate of Outyear Liability to Complete the Existing NPL

(Dollars in Thousands)

PROGRAM AREA	1987-1990 TOTAL	POST-FY90 ESTIMATE
DIRECT SITE SUPPORT	4,380,589.9	12,937,125.2
- SITE WORK	3,196,537.3	7,881,148.1
-- Removal Actions	444,055.5	506,878.4
-- Pre-Remedial Work	175,256.0	431,983.8
-- Engineering & Design Studies	813,053.8	1,686,510.9
-- Remedial Actions	1,677,964.3	5,255,775.0
-- Other	86,207.7	
- SITE SUPPORT	1,184,052.6	5,055,977.1
PROGRAM SUPPORT	1,152,420.5	4,000,905.3
SITE-RELATED WORK	344,202.0	1,647,214.7
TOTAL SUPERFUND	5,877,212.4	18,585,245.2

SOURCES: EPA Superfund Budget Documents.

- Approximately half of all new site starts will involve Fund lead (i.e., the Trust Fund will pay 90 percent of the cost); and

- On average, 80 percent of the Fund lead sites, 50 percent of the PRP lead sites, and 100 percent of the Federal Facility sites will require more than one RA before the site can be recommended for deletion from the NPL.

These factors are used to develop the current estimate because they represent a realistic assessment of how the program will be run and what is expected in the immediate future. The estimate of long-term Superfund liabilities is based on planning data for active sites and a number of assumptions about future sites and events. The actual site data are drawn directly from CERCLIS, Superfund's principal site activity data base. The assumptions represent a combination of programmatic directives (planning assumptions taken from the Superfund Program Management Manual) and historic performance averages. As a result, estimates produced by the model will vary over time (the CERCLIS data used by the model is updated every six months as a compromise between stability and accuracy) and in response to different sets of assumptions. Subsequent annual editions of this Report will contain different estimates.

Assumptions that have the greatest effect on the estimate include:

- *The extent of PRP involvement*: To the extent that PRPs assume greater responsibility for cleanups, Fund costs will drop dramatically. The $18.6 billion estimate assumes that in fiscal 1990 the Fund will take the lead on approximately 50 percent of all new RI/FS starts but that takeovers will rapidly increase the PRP portion of annual RA starts to more than 70 percent by fiscal 1997;
- *The ultimate size of the NPL*: The current estimate addresses the existing NPL only; and
- *Cleanup costs*: Future changes in the use of existing technologies, development of new technologies, and overall experience may reduce costs.

As more information is collected, every assumption in the model, including the above, may be adjusted to better depict future programmatic direction and refine previous analysis.

14.3.2 Major Program Elements Represented in the Model

To provide both a better estimate of the cost of the program and the flexibility needed to estimate the costs of future initiatives, the model includes many components which represent specific programmatic elements.

Currently Active Sites

Remedial efforts are underway at most of the sites on the existing NPL. Remedial plans are being developed for another group, leaving only 113 sites on the existing NPL that will be inactive -- sites which are on the NPL but at which efforts have not yet reached the Remedial Investigation/Feasibility Study (RI/FS) phase -- at the end of FY90. Initial remedial efforts are expected to be in progress at all of these remaining sites by the end of FY92.

Data on the active NPL sites are stored in Superfund's program management data base (CERCLIS). A version of these CERCLIS data is incorporated into the model to present the most accurate picture of planned activities at active sites. Because all but a few of the existing NPL sites are active -- remedial efforts have begun or are in planning -- these sites will constitute a large portion of any overall liability estimate.

In addition to the planned remedial activities, activities associated with the enforcement program have a significant impact on the costs of addressing Superfund sites. The occurrences of enforcement activities are estimated by the model using past programmatic experience and several standard sequences of activities, each representing a different enforcement approach. Enforcement related variables within the model address not only costs and FTEs, but also the shifts in remedial costs when Superfund assumes responsibility from, or passes responsibility to, a potentially responsible party. As with remedial activities, all activity costs and FTEs are estimated using Superfund planning factors.

New Site Starts

The model estimates the occurrence of all activities and related costs for any NPL site which is currently inactive, as defined above. The resource estimate included in this chapter is constrained to the existing NPL. An estimate could be produced for a larger number of sites to estimate the cost of future growth of the NPL. To do this, activities and related costs would be estimated for any number of new sites specified.

For the removal and preremedial programs in general, and for remedial activities at any sites beyond the existing NPL, the model allows the user to specify either annual growth rates and an overall cap or an actual number of new starts for each year for the following types of site/activity starts:

- Non-NPL Removals;
- NPL-Removals;
- Preliminary Assessments (initiates a preremedial program site start); and
- Remedial Investigation/Feasibility Studies (RI/FS) (initiates a remedial program site start).

For the purposes of the model, site starts for the removal, preremedial, and remedial programs are not linked, but there are enforcement considerations for each. By "uncoupling" the program areas, it is possible to estimate costs for the existing program and for a wide range of possible programmatic changes that affect the nature and number of new sites. Wide-reaching programmatic changes of this variety may come from any of several sources. Two formal sources of change are revisions to the HRS and NCP. Changes in either document could redefine the number and types of sites which must be addressed by the program and the objectives of such actions.

Who is Responsible? – Who Pays?

Aside from the number of sites requiring cleanup and the cost of individual cleanups, the factors surrounding the assumption of managerial and/or financial responsibility for a site have, perhaps, the largest impact on the costs of the Superfund program. There are many factors involved in this area, including:

- Emphasis on and effectiveness of the enforcement program;

- Willingness of states to assume responsibility; and
- Cost sharing arrangements between Superfund and the states and between Superfund and the PRPs.

The model accommodates each of these factors with one or more variables, allowing the estimation of Superfund liabilities for a wide range of lead and cost sharing possibilities. Variables include the:

- Proportion of sites addressed by each lead category;
- Number of PRP lead sites eligible for cost sharing and the portion of such costs assumed by the Fund;
- Number of sites that are owned/operated by state or local governments;
- Number of sites which follow each of several enforcement paths; and
- Expected success of cost recovery efforts.

Choices among these variables may affect the duration of individual cleanup efforts and the program overall by altering the mix of activity sequences which are used. The model includes several different sequences of activities, each of which is intended to be characteristic of one path that site-related activities might take. Each of the sequences involves different activities, with different durations and different schedules. A heavier reliance on enforcement, for instance, will result in longer elapsed times between the RI/FS start and Remedial Action (RA) completion. The model responds to lead and enforcement adjustments by changing the mix of these activity sequences.

Factors Related to Remedial Action Costs

The approach to RA cost estimation revolves around the development of seven technology categories, each with a unique average cost and expected treatment volume. The technology categories were developed from research into the Records of Decision (RODs) from FY87 and FY88.

RA cost adjustments within the model include the:

- Proportion of sites employing a particular technology category;
- Average volume of contaminated media addressed with each technology category; and
- Unit costs (cost per cubic yard of contaminated media) for each technology.

Adjustments of these variables make it possible to estimate the fiscal impact of:

- Policies which affect the selection of technological approach (e.g., treatment vs. containment);
- Changes in the contaminants found on-site (e.g., if remaining sites have higher levels of heavy metals than prior sites, incineration would be less useful);
- Changes in technology costs; and
- Changes in site size, either by technology (e.g., a policy to incinerate any site under 10,000 cubic yards) or across the entire range (e.g., if all of the biggest sites have been done, what is left will be smaller, on average).

Program Support and Other Agency Costs

Although not directly related to site activities, these elements constitute a large part of Superfund's budget and are included in the model. In general, the approach used to estimate these elements is to allow each of them to grow at some specified annual rate. Each of the growth rates can be changed independently, allowing for more rapid/slower growth of selected areas as programmatic demands change. In addition, some selected support elements are linked to the expansion/contraction of certain site-related activities and will either increase or decrease in size as those activities are affected by other variables.

14.4 Other Executive Branch Department and Agency Estimates of Resources Necessary to Complete Superfund Implementation

The second element in fulfilling the requirements of section 301(h)(1)(G) of CERCLA for this Report is to estimate the resources needed by other federal departments and agencies. EPA requested the resource requirement information from the other federal departments and agencies under a GSA IRCN issued on February 5, 1988, under the provisions of 41 CFR 201-45.6. EPA has sought to collect more comprehensive information for the FY88 report.

The resource needs of the other Executive branch departments and agencies for Superfund implementation activities are met through two sources:

- *Hazardous Substance Superfund (Trust Fund)*

  Interagency Budget. EPA transfers these monies to other federal departments and agencies from the Trust Fund to fund their activities in support of EPA's Superfund efforts. This is accomplished through an interagency budget under Executive Order 12580.

  Site-Specific Agreements. EPA transfers these funds to other federal departments and agencies from the Trust Fund through site-specific agreements.

- *Individual Federal Department or Agency Budgets*

CERCLA-Specific Funds. These funds are budgeted by the individual departments and agencies specifically for Superfund activities and support as part of the President's annual budget submission.

General Funds. These funds are used for CERCLA activities and support by the individual departments and agencies and are obtained from general budget resources or are taken from resources designated for other programs.

Exhibit 14.4-1 summarizes reported resource needs of other federal departments and agencies. The following information was provided by other departments and agencies to supplement the resource estimates.

- *Department of Defense.* The Department of Defense (DOD) has the authority and responsibility under CERCLA to clean up contamination associated with its past activities. Beginning in 1984, DOD increased its emphasis on hazardous waste cleanup by establishing the Defense Environmental Restoration Program (DERP). Under this program, DOD identifies, investigates, and cleans up contamination and other environmental damage on its installations and on formerly used properties. One element of DERP, the Installation Restoration Program, follows the procedures of the NCP in cleaning up contamination from past activities. The preliminary studies and remedial investigations that have been performed for sites in the past few years under this program are now leading to the identification of needed response work in 1989 and beyond. Studies have identified approximately 5,700 potential sites at 819 installations throughout the United States. Sites at 40 installations are included or proposed for inclusion to the NPL.

  DOD estimates that the total cost of the Installation Restoration Program work will be approximately $11 to 14 billion. The uncertainty in the total funding requirement for this program exists because many remedial investigations still must be completed, and many agreements have yet to be signed with EPA and state agencies.

- *Department of Energy.* No narrative provided.

- *Department of Health and Human Services*

  Agency for Toxic Substances and Disease Registry. During FY88, the Agency for Toxic Substances and Disease Registry (ATSDR) planned to complete 213 health assessments at NPL sites and 266 preliminary health assessments. Added to the 165 health assessments completed by the beginning of FY88 and the 176 completed by state cooperative agreement projects, this accounts for the completion of 820 health assessments or preliminary health assessments. CERCLA

Exhibit 14.4-1

CERCLA Resource Needs and Interagency Funding for Other Federal Departments and Agencies

(dollars in thousands/full-time equivalent workyears)

Federal Departments and Agencies	1987 Actual Dollars		1987 Actual FTEs	1988 Actual Dollars		1988 Actual FTEs
	Trust Fund	Agency Budget	Agency Budget	Trust Fund	Agency Budget	Agency Budget
Defense	--	375,900	N/A	--	402,800	1,060
Energy	--	47,663	N/A	--	86,953	N/A
Health and Human Services						
• ATSDR	32,439.3	--	175.0	42,999.9	--	175.0
• NIEHS	0	--	N/A	28,915.0	--	N/A
Justice	10,473	--	N/A	16,373.0	--	163.0
NASA	--	--	N/A	--	23,900.0	N/A
Transportation						
• USCG	4,023.3	6,615	168.5	3,027.6	7,803	171.5
Interior	707.6	6,900	15.0	1,113.5	9,600	24.0
FEMA	1,173.7	1,255	N/A	1,969.6	0	23.0
Commerce						
• NOAA	1,819.9	666	17.8	2,429.4	1,695	17.8
Labor						
• OSHA	281.3	0	N/A	380.9	0	15.5
Veterans Admin.	0	--	0	0	0	0
General Services Administration	--	150	0.3	--	261	4.0
Tennessee Valley Authority	--	200	0	0	--	0
Agriculture	--	--	N/A	--	1,500	N/A
TOTAL	50,918.1	439,349	376.6	97,208.9	534,512	1,653.8

SOURCES: EPA Superfund Budget Documents.

Exhibit 14.4-1 (continued)

CERCLA Resource Needs and Interagency Funding for Other Federal Departments and Agencies

(dollars in thousands/full-time equivalent workyears)

Federal Departments and Agencies	1989 Operating Plan Dollars		1989 Operating Plan FTEs	1990 Budget Request Dollars		1990 Budget Request FTEs	1987-1990 Total Dollars	
	Trust Fund	Agency Budget	Agency Budget	Trust Fund	Agency Budget	Agency Budget	Trust Fund	Agency Budget
Defense	--	500,000	N/A	--	--	N/A	--	1,278,700
Energy	--	112,839	N/A	--	181,904	N/A	--	429,359
Health and Human Services								
• ATSDR	44,500.0	--	175.0	44,500.0	--	250	164,439.2	--
• NIEHS	21,915.0	--	N/A	21,915.0	--	N/A	72,745.0	--
Justice	16,700.0	--	167.0	19,200.0	--	171.0	62,746.3	--
NASA	--	26,000.0	N/A	--	30,000.0	N/A	--	79,900.0
Transportation								
• USCG	4,948.2	8,639	173.5	4,948.2	--	N/A	16,947.3	23,057
Interior	1,253.5	24,700	23.0	1,253.3	--	13	4,328.1	41,200
FEMA	1,879.6	0	23.0	1,879.6	0	23.0	6,902.5	1,255
Commerce								
• NOAA	2,280.1	1,024	20.8	2,280.1	1,024	20.8	8,809.5	4,409
Labor								
• OSHA	1,008.2	0	15	1,008.2	--	12	2,678.6	--
Veterans Admin.	0	5,000	0	0	5,000	0	0	10,000
General Services Administration	--	0	19	--	--	N/A	--	411
Tennessee Valley Authority	0	--	0	0	--	0	--	200
Agriculture	--	2,500	N/A	--	--	N/A	--	4,000
TOTAL	94,484.6	680,702	616.3	96,984.6	217,928	489.8	339,596.2	1,872,491

SOURCES: EPA Superfund Budget Documents.

mandates that health assessments be performed for all 951 sites on the NPL by the end of FY88. The remaining 131 assessments are scheduled for completion during the first quarter of FY89. ATSDR also completed two pilot studies/investigations on selected populations during FY88 and initiated 22 others. It also provided over 2,200 health consultations at remedial sites.

In compliance with section 104(i)(3) of CERCLA, which requires ATSDR to prepare toxicological profiles on the first 100 most hazardous substances found at Superfund sites, ATSDR completed 25 during FY87 and planned to complete another 25 during FY88. The Agency also planned to conduct at least 1,000 health consultations to private or public health care providers in the provision of medical care and testing of exposed individuals.

ATSDR planned to finalize the *National Registry Proposal and Procedures for Persons Exposed to Toxic Substances*, as mandated under CERCLA. Also, ATSDR continued discussions with other agencies regarding toxicological profiles and health assessment research.

National Institute of Environmental Health Sciences. The Superfund Basic Research Program at the National Institute of Environmental Health Sciences (NIEHS) is authorized by the 1986 Superfund amendments and complements the existing applied research efforts underway at EPA and ATSDR. It differs from the research sponsored by other agencies in that it will combine basic research in ecology, engineering, and hydrogeology into a biomedical research program core designed to provide a broader and more detailed body of scientific information to be used by federal, state, and local agencies and by private organizations and industry in making decisions related to the management of hazardous substances.

- *Department of Justice*. The Department of Justice (DOJ) has two objectives under the Superfund program: to defend the program from legal challenges and to compel PRPs to comply with the law. Because of limited resources to support Superfund over the long term, enforcement is one of the keys to the success of the program.

  DOJ plays an integral role in the Superfund program through judicial enforcement actions to recover cleanup costs, impose civil penalties, and compel PRPs to perform cleanups. To this end, DOJ's three priorities for Superfund litigation are: (1) lodging and entering consent decrees that provide for privately funded remedial action; (2) injunctive relief actions to compel privately funded remedial action; and (3) cost recovery lawsuits to recoup Trust Fund monies spent cleaning up sites.

- *National Aeronautics and Space Administration*. The National Aeronautics and Space Administration (NASA) projects that in FY90 its resource needs for cleaning up its properties will be $30 million. Studies, assessments, and design costs are approximately $2.09 million; RI/FS costs are $2.75 million. For cleanup projects costing less than $150,000 each, the total amount needed is $2.88 million. For projects exceeding $150,000 each, the total costs are estimated at $22.28 million for activities focusing on air pollution abatement, asbestos management, rehabilitation/ replacement of PCB transformers, hazardous waste monitoring and control, replacement of underground storage tanks, and rehabilitation/upgrading of treatment systems.

- *Department of Transportation*. The Department of Transportation (DOT) estimates that it will use fiscal 1989 funds from its department budget for its CERCLA-related activities in the Federal Aviation Administration (FAA), the Research and Special Programs Administration (RSPA), the U.S. Coast Guard (USCG), and the Maritime Administration (MARAD). The substantial increase in total program needs over FY87 results from an expansion of the FAA Pollution Abatement Program, which averages between 70 percent and 80 percent of DOT's total needs per year. The decrease in total work years results from adjusting USCG numbers to reflect only individual agency budget figures.

  A Trust Fund appropriation through general Interagency Agreements enables USCG to maintain its response capabilities, ensures that CERCLA financial responsibility requirements are met, trains emergency response personnel using program modules and simulation drills, staffs the CERCLA component of the National Response Center, and maintains chemical information systems and records of characteristics for certain chemicals.

  FAA receives no monies from the Superfund. Its CERCLA activities will focus on hazardous waste cleanup at closed facilities and other cleanup efforts to remove asbestos and PCBs.

  RSPA supports the Superfund program through its rulemaking, technical support, information and planning data development, and emergency response support activities.

  USCG is a major supporter of the Superfund program through its role as the predesignated Federal On-Scene Coordinator in the Coastal Zone for responding to actual or threatened releases of hazardous substances. It also must address pollution abatement related to the operation of its own facilities.

MARAD receives no monies from the Superfund. The Administration is a *de minimis* third party PRP for a cleanup project at a nuclear waste site in Maxey Flats, Kentucky, where waste from the nuclear ship SAVANNAH was deposited. A one-time funding allocation is projected for FY89.

- *Department of the Interior*. Each of the nine bureaus and four territorial elements of the Department of the Interior (DOI) has provided support to the Superfund program, mostly assisting the National Response Team and the Regional Response Teams. DOI's role in the program focuses on three general areas:

  Response Management, including RRT assistance activities, incident-specific activities, and NPL site remedial response activities;

  Emergency Response Preparedness, including RRT participation, regional RRT workgroups, and RRT support; and

  Trust Resources/Damage Assessment, including coordination of natural resource trustee concerns, natural resource damage assessment briefings, and settlements of trustee resources.

- *Federal Emergency Management Agency*. The enactment of SARA in 1986 made many of the voluntary preparedness and planning activities of the Federal Emergency Management Agency (FEMA), including activities required by Title III, ineligible for funding under the Superfund budget after September 30, 1987. To continue the ongoing Superfund assistance to state and local governments and to support their efforts to implement Title III, FEMA, in FY88, consolidated its funding requests under two separate authorizations of appropriation. Funding for all Superfund activities was requested under the Superfund Interagency Budget, and the remainder of FEMA's hazardous materials activities, including Title III, was incorporated into FEMA's own operating budget (under its Earthquake and Other Hazards Budget). Thus, no additional funds were requested under Section 301(h)(1)(G) to carry out Superfund activities after FY87.

- *Department of Commerce*. The National Oceanic and Atmospheric Administration (NOAA) carries out many of the responsibilities of the Department of Commerce (DOC) under CERCLA. NOAA's Superfund program goals are: (1) to strengthen and accelerate technologies to plan for, and respond to hazardous substance releases in coastal and marine areas; and (2) to assist EPA in identifying, evaluating, and mitigating the adverse effects of hazardous substances on natural resources in coastal and marine ecosystems.

These goals are addressed primarily through NOAA's efforts to build an effective network of Scientific Support Coordinators and core support groups to assist Federal On-Scene Coordinators in responding to hazardous substance releases into coastal or marine waters. It also has developed computerized contingency plans for major U.S. ports.

NOAA also acts on behalf of the Secretary of Commerce as a federal trustee for natural resources in coastal and marine areas affected by hazardous substance releases. NOAA Coastal Resource Coordinators, funded through Superfund and assigned to EPA Regional offices, assist the Agency in evaluating natural resource concerns at coastal hazardous substance release sites and in improving coordination with federal and state natural resource trustees. The resource estimates do not include those resources necessary to meet NOAA's role as a federal trustee for natural resources.

- *Department of Labor*. Funds appropriated under general IAGs will allow the Occupational Safety and Health Administration (OSHA) of the Department of Labor (DOL) and states operating OSHA-approved plans to continue providing EPA and other response personnel with technical assistance to protect workers at Superfund sites, implementing the worker safety program at Superfund sites, and supporting the National and Regional Response Teams.

  OSHA conducts inspections at Superfund sites to ensure that employers are in compliance with all applicable OSHA standards, including the standard for employees engaged in hazardous waste operations, as mandated by section 126 of CERCLA. In FY90, OSHA will implement a training/certification program as required by CERCLA section 126.

  OSHA performs laboratory analyses of samples collected at Superfund site inspections and maintains and calibrates technical equipment used for these inspections. OSHA's analytical laboratory also maintains a computerized system for tracking hazardous waste inspection activity. In FY90, OSHA will perform up to three technical assistance site visits and will update the Agency's Hazardous Waste Reference Manual. As a member of the National Response Team and the associated Regional Response Teams, OSHA assists the teams in meeting their annual workplans.

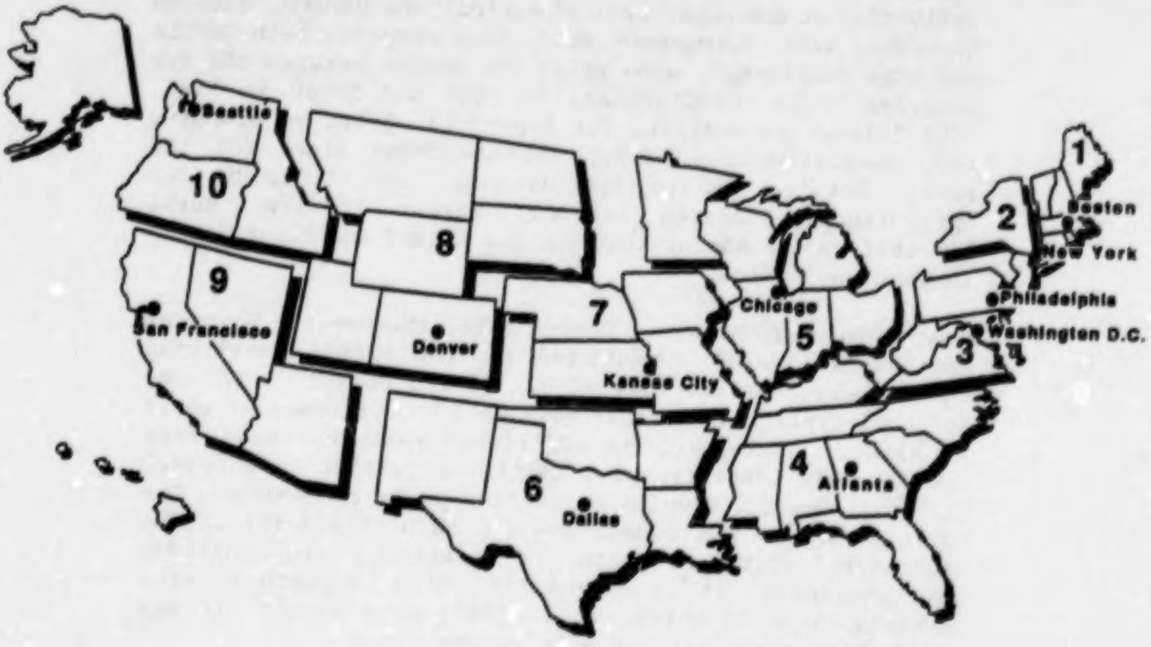
- *Veterans Administration*. Prior to FY89, no funds had been specifically budgeted for Superfund cleanups. In FY89 and subsequent years, the Veterans Administration (VA) will be budgeting for $5 million to meet projected costs. At the present time, the VA is a PRP at two sites (Baldwin, Florida and Holden, Missouri).

- *Department of Agriculture*. Congress appropriated $2 million in FY88 and $5 million in FY89 for hazardous waste management activities at the Department of Agriculture (USDA). Because hazardous waste management activities comprise both CERCLA and RCRA compliance, USDA split the monies between the two programs 75/25 (CERCLA/RCRA) in FY88 and 50/50 in FY89. USDA intends to dedicate its Superfund effort to planning and remedial action efforts at abandoned mines for the Forest Service and to various other activities by the Agricultural Research Service, Forest Service, Rural Electrification Administration, and Animal and Plant Health Inspection Service.

- *General Services Administration*. During FY88, the General Services Administration (GSA) conducted PAs for 18 GSA facilities that appeared on the federal facilities docket. GSA does not anticipate that further work will be performed at these 18 sites. Therefore, no additional resources have been specifically identified for CERCLA activities. Resources for environmental studies/corrective projects, however, are included in the GSA budget and can be utilized for CERCLA studies/corrective projects, if necessary. In addition, GSA currently is involved in five Superfund site investigations in which it is a PRP; as a result, it may incur third-party PRP costs in future years.

- *Tennessee Valley Authority*. No narrative provided.

EPA Headquarters and Regional Superfund Offices



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APPENDIX A

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON SEPTEMBER 30, 1988

Appendix A satisfies the combined statutory requirements of CERCLA sections 301(h)(1)(B) and (F). This appendix provides a report on the status and estimated completion date of all remedial investigation/feasibility study (RI/FS) and remedial action (RA) Title I projects in progress at the end of FY88. This appendix also provides notice of RI/FSs that EPA presently believes will not meet its previously published schedule for completion, as well as the new estimated dates of completion, as required by section 301(h)(1)(C). Estimated completion dates for these projects were previously published in Appendix D of the FY87 Report entitled *Progress Toward Implementing Superfund: Fiscal Year 1987*. In addition to the statutory requirements, this appendix lists remedial projects begun in FY88 that were ongoing at the end of FY88. For a complete discussion of the stages of the remedial process, see section 3.3 of this Report.

Column 1:	**Region**	EPA Region in which the site is located. See final exhibit in report text for the locations of the 10 EPA Regional offices.
Column 2:	**State**	State in which the site is located. See Exhibit 5.0-2 for the distribution of National Priorities List (NPL) sites throughout the States and territories.
Column 3:	**Site Name**	Name of the site, as listed on the *NPL, Supplementary Lists and Supporting Materials*, June 1988, OERR.
Column 4:	**Location**	Location of the site, as listed on the NPL.
Column 5:	**Activity**	Type of project in progress on September 30, 1988.
Column 6:	**Lead**	The entity leading the activity, as follows: • **EP**: Fund-financed with EPA employees performing the project, not contractors; • **F**: Fund-financed and Federal-lead by the Superfund remedial program; • **FE**: EPA Enforcement program-lead; • **FF**: Federal Facility-lead; • **PRP**: PRP-lead and -financed;

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- **PS:** PRP-financed work performed by the PRP under a state order (may include federal financing or federal oversight under an enforcement document);
- **S:** State-lead and Fund-financed; and
- **SE:** State enforcement-lead (may include federal financing); State-lead and -financed, no Fund money.

O (Other), SN (State-lead and -financed, no Fund money), and SR (State-ordered PRP response) activities are excluded from this status report because they do not include federal financing.

Column 7:	**Funding Start**	The date on which funds were allocated for the activity. The funding start dates of several projects listed in this appendix differ from the dates that were published in the FY87 Report. For this appendix, such projects were assumed to be the same if the funding start dates were within the same fiscal year. Some projects with a status of "new" have a funding start date prior to FY88 because the Region developed an estimated completion date for the project in FY88, rather than in the fiscal year in which funds were allocated. Thus, these projects were not listed in the FY87 Report.
Column 8:	**Previously Published Completion Schedule**	For projects ongoing at the end of FY87 that continued into FY88, the quarter of the planned completion date for the activity, as of 9/30/87, the end of FY87. This column is blank for projects that were not begun until FY88. For projects listed in Appendix D of the FY87 Report without an estimated completion date, such as the RI/FS at the Silresim Chemical Corp., in Lowell, Massachusetts, * * * * appears in the Status column.
Column 9:	**Present Quarter Estimated Completion**	The quarter of the planned completion date for the activity, as of 9/30/88. CERCLIS compiled this information on March 6, 1989.

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Column 10: Status

Status of the project, as of the end of FY88.

On-schedule projects are designated by a zero (0).

Projects that are behind schedule are designated by a numeral indicating the number of quarters that the project is behind schedule and a minus sign (e.g., -4).

Projects that are ahead of schedule are designated by a numeral indicating the number of quarters that the project is ahead of schedule (e.g., 4).

Projects for which EPA has not estimated a completion date are designated by an asterisk (*). Projects that were begun in FY88 are described as new in the status column.

For example, the RA at the Beacon Heights Landfill in Beacon Falls, Connecticut was new this fiscal year; the RI/FS at the Kellogg Deering Well Field in Norwalk, Connecticut was one quarter behind schedule, as compared to its estimated date of completion at the end of FY87.

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.	PRESENT QTR. EST. COMPLETION	STATUS
1.	1	CT	Beacon Heights Landfill	Beacon Falls	RA	PRP	02/03/88		3 89	new
2.	1	CT	Kellogg-Deering Well Field	Norwalk	RI/FS	F	06/19/87	2 89	3 89	-1
3.	1	CT	Old Southington Landfill	Southington	RI/FS	PRP	09/29/87		2 91	new
4.	1	CT	Solvents Recovery Service of New England	Southington	RA	PRP	01/07/86	4 89	4 91	-8
					RA	PRP	10/29/86	1 89	4 91	-11
					RI/FS	F	08/12/88		4 91	new
5.	1	MA	Baird & McGuire	Holbrook	RI/FS	F	05/21/87	2 89	2 90	-4
					RI/FS	F	05/21/87	2 89	4 89	-2
6.	1	MA	Cannon Engineering Corp. (CEC)	Bridgewater	RI/FS	F	09/04/87		2 89	new
7.	1	MA	Charles-George Reclamation Trust Landfill	Tyngsborough	RA	F	08/19/87	3 90	3 90	0
8.	1	MA	Groveland Wells	Groveland	RI/FS	F	08/18/83	4 89	3 90	-3
9.	1	MA	Iron Horse Park	Billerica	RI/FS	F	08/08/85		4 89	new
10.	1	MA	New Bedford Site	New Bedford	FS	F	02/15/85		4 89	new
					RI/FS	F	08/18/83	2 89	4 89	-2
					RI/FS	F	09/01/86		4 89	new
11.	1	MA	Norwood PCBs	Norwood	RI/FS	FE	05/21/87	2 89	4 89	-2
12.	1	MA	Nyanza Chemical Waste Dump	Ashland	RA	F	12/31/87		1 90	new
					RI/FS	F	05/21/87	3 89	1 91	-6
					RI/FS	F	05/21/87	3 89	2 90	-3
13.	1	MA	PSC Resources	Palmer	RI/FS	S	09/29/87	3 89	3 90	-4
14.	1	MA	Salem Acres	Salem	RI/FS	PRP	06/15/87	2 89	2 90	-4
15.	1	MA	Silresim Chemical Corp.	Lowell	RI/FS	PRP	06/30/85	**** ****	2 90	****
16.	1	MA	Sullivan's Ledge	New Bedford	RI/FS	F	08/16/85	1 89	2 89	-1
17.	1	MA	Wells G&H	Woburn	RI/FS	FE	11/01/84		3 89	new
18.	1	MA	W.R. Grace & Co., Inc. (Acton Plant)	Acton	RI/FS	PRP	10/21/80		* *	new
					RI/FS	PRP	10/22/80		4 89	new

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19.	1	ME	Brunswick Naval Air Station	Brunswick	RI/FS	FF	02/22/88		1 91	new
20.	1	ME	O'Connor Co.	Augusta	RI/FS	PRP	05/13/86	2 89	4 89	-2
21.	1	ME	Pinette's Salvage Yard	Washburn	RI/FS	F	12/31/84	2 89	3 89	-1
22.	1	ME	Saco Tannery Waste Pits	Saco	RI/FS	F	09/01/87	3 88	3 89	-4
23.	1	ME	Union Chemical Co., Inc.	South Hope	RI/FS	PRP	09/15/87	4 90	4 90	0
24.	1	ME	Winthrop Landfill	Winthrop	RA	PRP	11/19/86	3 92	3 92	0
25.	1	NH	Auburn Road Landfill	Londonderry	RI/FS	F	03/30/84	1 89	3 89	-2
26.	1	NH	Coakley Landfill	North Hampton	RI/FS	S	08/12/85	4 88	3 89	-3
27.	1	NH	Dover Municipal Landfill	Dover	FS	PRP	07/22/88		3 90	new
28.	1	NH	Kearsarge Metallurgical Corp. (once listed as Kearsage Metallurgical Corp.)	Conway	RI FS	PRP S	01/21/85 07/22/88		2 89 4 90	new new
29.	1	NH	Mottolo Pig Farm	Raymond	RI/FS	PRP	05/20/88		1 91	new
30.	1	NH	Savage Municipal Water Supply	Milford	RI/FS	PRP	08/10/87	1 90	4 90	-3
31.	1	NH	Somersworth Sanitary Landfill	Somersworth	RI/FS	S	03/30/84	1 89	3 90	-6
32.	1	NH	South Municipal Water Supply Well	Peterborough	RI/FS	PRP	07/22/86	2 89	4 89	-2
33.	1	RI	Central Landfill	Johnston	RI/FS	FE	04/03/87	1 90	2 91	-5
34.	1	RI	Davis Liquid Waste	Smithfield	RA	F	04/27/88		4 90	new
35.	1	RI	Peterson/Puritan, Inc.	Lincoln/Cumberland	RI/FS	PRP	05/29/87	3 90	3 90	0
36.	1	RI	Picillo Farm	Coventry	RI/FS	F	11/09/87		4 91	new
37.	1	RI	Stamina Mills, Inc. (once listed as Forestdale-Stamina Mills, Inc.)	North Smithfield	RI/FS	F	04/26/85	1 89	2 90	-5

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38.	1	RI	Western Sand & Gravel	Burrillville	RA	PRP	09/25/87	1 89	2 90	-5
					RI/FS	PRP	06/03/87	1 89	2 90	-5
39.	1	VT	Pine Street Canal	Burlington	RI/FS	F	06/27/88		3 91	new
40.	2	NJ	A. O. Polymer	Sparta Township	RI/FS	S	09/27/85	2 89	4 90	-6
41.	2	NJ	Bog Creek Farm	Howell Township	RA	F	07/29/88		1 91	new
					RI/FS	F	05/16/86	1 89	3 89	-2
42.	2	NJ	Bridgeport Rental & Oil. Services	Bridgeport	RA	F	04/19/88		4 92	new
					RI/FS	F	09/29/88		1 93	new
43.	2	NJ	Burnt Fly Bog	Marlboro Township	RA	S	12/07/83	1 89	4 89	-3
					RI/FS	S	09/30/88		4 90	new
44.	2	NJ	CPS/Madison Industries	Old Bridge Township	RI/FS	PS	01/15/83		4 89	new
45.	2	NJ	Caldwell Trucking Co.	Fairfield	RA	F	07/27/88		4 89	new
					RI/FS	F	04/18/87	1 89	3 89	-2
46.	2	NJ	Chemical Leaman Tank Lines, Inc. (once listed as Chemical Leaman Tank Liners, Inc.)	Bridgeport	RI/FS	PRP	07/15/85	3 88	2 89	-3
47.	2	NJ	Chemsol, Inc.	Piscataway	RI/FS	PS	07/09/84		3 90	new
48.	2	NJ	Ciba-Geigy Corp. (once listed as Toms River Chemical)	Toms River	RI/FS	FE	03/30/84	2 88	2 89	-4
49.	2	NJ	Cinnaminson Township (Block 702) Ground Water Contamination	Cinnaminson Township	RI/FS	F	03/29/85	1 89	4 89	-3
50.	2	NJ	Combe Fill North Landfill	Mount Olive Township	RA	S	09/30/88		1 91	new
51.	2	NJ	Cosden Chemical Coatings Corp.	Beverly	RI/FS	F	04/14/88		1 91	new
52.	2	NJ	Curcio Scrap Metal, Inc.	Saddle Brook Township	RI/FS	PRP	04/29/88		2 91	new
53.	2	NJ	De Rewal Chemical Co.	Kingwood Township	RI/FS	F	06/28/85	1 89	4 89	-3
54.	2	NJ	Delilah Road	Egg Harbor Township	RI/FS	S	03/30/84	1 89	4 89	-3
55.	2	NJ	Denzer & Schafer X-Ray Co.	Bayville	RI/FS	S	06/26/87	1 89	1 91	-8

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56.	2	NJ	Ellis Property	Evesham Township	RI/FS	S	09/26/84	4 88	1 91	-9
57.	2	NJ	Ewan Property	Shamong Township	FS	F	09/29/88		2 89	new
58.	2	NJ	Fair Lawn Well Field	Fair Lawn	RA	SE	09/15/87		4 97	new
59.	2	NJ	Fort Dix (Landfill Site)	Pemberton Township	FS	FF	11/15/86	3 88	3 89	-4
60.	2	NJ	Fried Industries	East Brunswick Township	RI/FS	FE	06/28/85	2 89	1 91	-7
61.	2	NJ	Garden State Cleaners Co.	Minotola	RI/FS	FE	09/20/88		1 91	new
62.	2	NJ	GEMS Landfill	Gloucester Township	RA	S	09/30/88		2 91	new
63.	2	NJ	Glen Ridge Radium Site	Glen Ridge	RI/FS	F	12/13/84	2 88	3 89	-5
64.	2	NJ	Helen Kramer Landfill	Mantua Township	RA	F	09/23/88		1 92	new
65.	2	NJ	Hercules, Inc. (Gibbstown Plant)	Gibbstown	RI/FS	PS	07/02/86	1 90	2 90	-1
66.	2	NJ	Hopkins Farm	Plumstead Township	RI/FS	SE	02/03/87	2 89	1 91	-7
67.	2	NJ	Imperial Oil Co., Inc./Champion Chemcials	Morganville	RI/FS	S	09/28/84	2 89	1 91	-7
68.	2	NJ	Industrial Latex Corp.	Wallington Borough	RI/FS	F	09/20/88		2 91	new
69.	2	NJ	King of Prussia	Winslow Township	RI/FS	PRP	04/17/85	2 89	4 89	-2
70.	2	NJ	Lipari Landfill	Pitman	RA	F	09/23/88		2 91	new
71.	2	NJ	Lodi Municipal Well	Lodi	RI/FS	F	06/19/87	1 89	3 90	-6
72.	2	NJ	Lone Pine Landfill	Freehold Township	RA RI/FS	F PRP	09/23/88 09/30/85	 4 88	3 91 3 89	new -3
73.	2	NJ	Mannheim Avenue Dump	Galloway Township	RI/FS	PRP	05/09/88		4 90	new
74.	2	NJ	Maywood Chemical Co.	Maywood/Rochelle Park	RI/FS	PRP	09/21/87		2 91	new
75.	2	NJ	Metaltec/Aerosystems	Franklin Borough	RI/FS	F	03/26/87	2 89	1 91	-7

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.	PRESENT QTR. EST. COMPLETION	STATUS
76.	2	NJ	Monitor Devices/Intercircuits, Inc.	Wall Township	RI/FS	S	06/01/86	1 89	4 91	-11
77.	2	NJ	Montclair/West Orange Radium Site	Montclair/West Orange	RI/FS	F	12/13/84	2 88	3 89	-5
78.	2	NJ	Myers Property	Franklin Township	RI/FS	F	09/26/85	1 89	2 90	-5
79.	2	NJ	M&T Delisa Landfill	Asbury Park	RI/FS	PRP	03/31/88		2 90	new
80.	2	NJ	Nascolite Corp.	Millville	RI/FS	F	04/01/88		1 91	new
81.	2	NJ	NL Industries	Pedricktown	RI/FS	PRP	04/25/86	1 89	1 91	-8
82.	2	NJ	Pepe Field	Boonton	RI/FS	S	09/26/84	4 88	4 90	-8
83.	2	NJ	Pohatcong Valley Ground Water Contamination	Warren County	RI/FS	FE	09/30/88		4 91	new
84.	2	NJ	Pomona Oaks Residential Wells	Galloway Township	RI/FS	F	12/24/86	3 89	3 90	-4
85.	2	NJ	Renora, Inc.	Edison Township	RA	PRP	09/06/88		3 90	new
86.	2	NJ	Rockaway Borough Well Field	Rockaway Township	RI/FS	F	09/07/88		2 91	new
87.	2	NJ	Roebling Steel Co.	Florence	RI/FS	F	06/19/84	1 89	3 89	-2
88.	2	NJ	Scientific Chemical Processing	Carlstadt	RI/FS	PRP	09/30/85	3 89	3 89	0
89.	2	NJ	South Jersey Clothing Co.	Minotola	RI/FS	FE	09/20/88		1 91	new
90.	2	NJ	Swope Oil & Chemical Co.	Pennsauken	RA RI/FS	PRP PRP	09/07/88 08/18/86	 1 90	4 90 3 90	new -2
91.	2	NJ	Universal Oil Products (Chemical Division)	East Rutherford	RI/FS	PS	05/28/86	1 90	3 90	-2
92.	2	NJ	Upper Deerfield Township Sanitary Landfill	Upper Deerfield Township	RI/FS	F	09/30/87	1 90	3 90	-2
93.	2	NJ	U.S. Radium Corp.	Orange	RI/FS	F	09/28/84	1 90	1 91	-4
94.	2	NJ	Vineland Chemical Co., Inc.	Vineland	RI/FS	F	05/21/86	4 88	2 89	-2
95.	2	NJ	Waldick Aerospace Devices, Inc.	Wall Township	RI/FS	F	12/31/87		2 90	new

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96.	2	NY	American Thermostat Co.	South Cairo	RI/FS	F	12/14/87	1 88	2 90	-9
97.	2	NY	Batavia Landfill	Batavia	RI/FS	PRP	08/09/84	1 89	3 90	-6
98.	2	NY	BEC Trucking	Town of Vestal	RI/FS	F	09/23/87	2 90	4 89	2
99.	2	NY	BioClinical Laboratories, Inc.	Bohemia	RI/FS	F	03/31/88		3 90	new
100.	2	NY	Brewster Well Field	Putnam County	RA	F	09/23/87	4 88	3 90	-7
101.	2	NY	Byron Barrel & Drum	Byron	RI/FS	FE	07/30/87	2 90	2 90	0
102.	2	NY	Circuitron Corp.	East Farmingdale	RI/FS	F	09/27/88		2 91	new
103.	2	NY	Claremont Polychemical	Old Bethpage	RI/FS	F	03/31/88		1 91	new
104.	2	NY	C & J Disposal Leasing Co. Dump	Hamilton	RI/FS	FE	09/29/88		1 91	new
105.	2	NY	Endicott Village Well Field	Village of Endicott	RA RI/FS	PRP PRP	09/21/88 09/19/88		3 90 4 91	new new
106.	2	NY	Facet Enterprises, Inc.	Elmira	RI RI/FS	PRP PRP	04/08/83 05/22/86	 1 89	4 89 3 90	new -6
107.	2	NY	Fulton Terminals	Fulton	RI/FS	F	09/29/88		3 89	new
108.	2	NY	GE Moreau Site	South Glen Falls	RA	PRP	09/23/87		3 89	new
109.	2	NY	General Motors (Central Foundry Division)	Massena	RI/FS	PRP	04/16/85	2 89	3 89	-1
110.	2	NY	Genzale Plating Co.	Franklin Square	RI/FS	F	03/31/88		2 91	new
111.	2	NY	Goldisc Recordings, Inc.	Holbrook	RI/FS	PS	12/20/85		3 90	new
112.	2	NY	Haviland Complex	Town of Hyde Park	RA	F	09/29/88		4 89	new
113.	2	NY	Hooker Chemical/Ruco Polymer Corp.	Hicksville	RI/FS	PRP	09/21/88		4 91	new
114.	2	NY	Hooker (102nd Street)	Niagara Falls	RI/FS	PRP	06/26/84	1 89	4 90	-7
115.	2	NY	Hooker (Hyde Park)	Niagara Falls	RA	PRP	08/15/87	4 88	1 90	-5
116.	2	NY	Hooker (South Area)	Niagara Falls	RI/FS RI/FS	PRP PRP	01/10/84 01/10/84	2 89 3 89	2 90 1 91	-4 -6

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117.	2	NY	Hudson River PCBs	Hudson River	RA	S	09/28/84	4 88	1 92	-13
118.	2	NY	Kentucky Avenue Well Field	Horseheads	RA	S	09/30/88		2 90	new
					RA	F	09/30/88		2 90	new
					RI/FS	F	09/23/87	1 89	2 90	-5
119.	2	NY	Love Canal	Niagara Falls	RA	S	06/26/87	4 88	4 89	-4
					RA	S	06/26/87	2 88	1 89	-3
					RA	S	02/09/87	4 88	2 89	-2
120.	2	NY	Ludlow Sand & Gravel	Clayville	RI/FS	FE	09/30/88		1 91	new
121.	2	NY	Marathon Battery Corp.	Cold Springs	RA	F	09/26/88		4 89	new
					RI/FS	F	12/31/85	3 88	2 89	-3
122.	2	NY	Mattiace Petrochemical Co., Inc.	Glen Cove	RI/FS	F	09/29/88		1 91	new
					RI/FS	F	09/29/88		1 90	new
123.	2	NY	Mercury Refining, Inc.	Colonie	RI/FS	SE	08/18/83		* *	new
124.	2	NY	Niagara County Refuse	Wheatfield	RI/FS	FE	09/23/87	1 90	3 89	2
125.	2	NY	North Sea Municipal Landfill	North Sea	RI/FS	PRP	03/31/87	3 89	4 89	-1
126.	2	NY	Olean Well Field	Olean	RA	PRP	01/27/88		4 89	new
					RI/FS	FE	09/23/87	4 88	2 91	-10
127.	2	NY	Pasley Solvents & Chemicals, Inc.	Hempstead	RI/FS	PRP	08/19/88		2 91	new
128.	2	NY	Pollution Abatement Services	Oswego	RA	S	03/29/85	1 89	3 90	-6
129.	2	NY	Port Washington Landfill	Port Washington	RI/FS	FE	05/21/86	2 89	2 89	0
130.	2	NY	Preferred Plating Corp.	Farmingdale	RI/FS	F	07/30/87	1 90	4 89	1
131.	2	NY	Richardson Hill Road Landfill/Pond	Sidney Center	RI/FS	PRP	07/22/87	3 89	3 91	-8
132.	2	NY	Robintech, Inc./National Pipe Co.	Town of Vestal	RI/FS	PRP	10/08/87	3 89	2 91	-7
133.	2	NY	Rowe Industries Ground Water Contamination	Noyack/Sag Harbor	RI/FS	PRP	09/30/88		2 91	new
134.	2	NY	Sarney Farm	Amenia	RI/FS	FE	06/29/85	1 89	3 90	-6

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135.	2	NY	Sinclair Refinery	Wellsville	RI/FS	PRP	07/28/88		3 90	new
136.	2	NY	SMS Instruments, Inc.	Deer Park	RI/FS	F	04/18/87	4 89	2 89	2
137.	2	NY	Solvent Savers	Lincklaen	RI/FS	F	09/02/87	2 90	3 90	-1
138.	2	NY	Syossset Landfill	Oyster Bay	RI/FS	PRP	07/01/86	1 90	2 90	-1
139.	2	NY	Tronic Plating Co., Inc.	Farmingdale	RI/FS	PRP	06/07/88		4 91	new
140.	2	NY	Vestal Water Supply Well 1-1 (once listed with Well 4-2 as one site)	Vestal	RA RI/FS	F F	09/30/87 04/24/87	4 88 1 89	3 90 3 89	-7 -2
141.	2	NY	Volney Municipal Landfill	Town of Volney	RI/FS	F	12/30/87		1 91	new
142.	2	NY	Warwick Landfill	Warwick	RI/FS	F	04/19/88		4 90	new
143.	2	NY	York Oil Co.	Moira	RI/FS	F	06/28/88		3 89	new
144.	2	PR	Barceloneta Landfill	Florida Afuera	RI/FS	FE	08/30/88		3 91	new
145.	2	PR	Fibers Public Supply Wells	Jobos	RI/FS	PRP	12/27/85	2 89	1 91	-7
146.	2	PR	Frontera Creek	Rio Abajo	RI/FS	PRP	10/03/86	4 89	2 91	-6
147.	2	PR	Juncos Landfill	Juncos	RI/FS	PRP	10/09/84	2 89	1 91	-7
148.	2	PR	RCA Del Caribe	Barceloneta	RI/FS	PRP	03/31/88		3 92	new
149.	2	PR	Vega Alta Public Supply Wells	Vega Alta	RI/FS	FE	09/20/88		3 91	new
150.	3	DE	Chem-Solv, Inc.	Cheswold	RI/FS	PS	09/27/88		2 91	new
151.	3	DE	Coker's Sanitation Service Landfills	Kent County	RI/FS	PRP	12/31/87		3 90	new
152.	3	DE	Delaware City PVC Plant (once listed as Stauffer Chemical Co.)	Delaware City	RA	PRP	03/31/88		2 90	new
153.	3	DE	E.I. Du Pont de Nemours & Co., Inc. (Newport Pigment Plant Landfill)	Newport	RI/FS	PRP	08/12/88		2 90	new
154.	3	DE	Halby Chemical Co.	New Castle	RI/FS	F	03/06/87	1 89	2 90	-5

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155.	3	DE	NCR Corp. (Millsboro Plant)	Millsboro	RI/FS	PS	03/10/88		1 91	new
156.	3	DE	New Castle Spill (once listed as TRIS Spill)	New Castle County	RI/FS	SE	12/10/87		1 90	new
157.	3	DE	Standard Chlorine of Delaware, Inc.	Delaware City	RI/FS	PS	11/30/87		2 91	new
158.	3	MD	Kane & Lombard Street Drums	Baltimore	RA	F	09/29/88		3 90	new
159.	3	MD	Mid-Atlantic Wood Preservers, Inc.	Harmans	RI/FS	PRP	07/11/86	4 88	1 91	-9
160.	3	MD	Sand, Gravel & Stone	Elkton	RI/FS	PRP	01/16/86	3 88	3 89	-4
161.	3	PA	Aladdin Plating, Inc.	Scott Township	RA	F	09/29/88		3 90	new
162.	3	PA	Ambler Asbestos Piles	Ambler	RI/FS	PRP	12/30/87		4 89	new
163.	3	PA	American Electronics Laboratories	Montgomeryville	RI/FS	F	06/30/88		2 90	new
164.	3	PA	Ametek, Inc. (Hunter Spring Division)	Hatfield	RI/FS	F	06/30/88		2 90	new
165.	3	PA	Avco Lycoming (Williamsport Division)	Williamsport	RI/FS	PRP	06/27/88		4 89	new
166.	3	PA	Bally Gound Water Contamination	Bally Borough	RI/FS	PRP	01/28/87	4 88	3 89	-3
167.	3	PA	Blosenski Landfill	West Caln Township	RA	F	03/24/87	2 88	1 89	-3
168.	3	PA	Brown's Battery Breaking	Shoemakersville	RI/FS	F	09/29/88		3 90	new
169.	3	PA	Bruin Lagoon	Bruin Borough	RA	F	06/28/88		2 91	new
170.	3	PA	Butler Mine Tunnel	Pittston	RI/FS	PRP	03/30/87	3 89	4 91	-9
171.	3	PA	C & D Recycling	Foster Township	RI/FS	PRP	08/31/87	3 89	2 90	-3
172.	3	PA	Commodore Semiconductor Group	Lower Providence Township	RI/FS	PRP	07/29/88		3 91	new
173.	3	PA	Croydon TCE	Croydon	RI/FS	F	09/30/88		1 90	new
174.	3	PA	CryoChem, Inc.	Worman	RI/FS RI/FS	F PRP	03/06/87 12/18/88	1 89	2 88 4 89	3 new

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175.	3	PA	Delta Quarries & Disposal, Inc./ Stotler Landfill	Antis/Logan Townships	RI/FS	PRP	10/09/87	4 89	2 91	-6
176.	3	PA	Dorney Road Landfill	Upper Macungie Township	RI/FS	F	08/17/88		3 89	new
177.	3	PA	Douglassville Disposal	Douglassville	RI/FS	F	03/03/87	3 88	3 89	-4
178.	3	PA	Drake Chemical	Lock Haven	RA	F	06/20/87	1 89	3 89	-2
179.	3	PA	East Mount Zion	Springettsbury Township	RI/FS	S	02/09/84	1 89	3 89	-2
180.	3	PA	Eastern Diversified Metals	Hometown	RI/FS	PRP	10/19/87		3 90	new
181.	3	PA	Gentle Cleaners, Inc./ Granite Knitting Mills, Inc.	Souderton	RI/FS	F	06/30/88		2 90	new
182.	3	PA	Havertown PCP	Haverford	RI/FS	S	02/09/84	1 89	3 89	-2
183.	3	PA	Hebelka Auto Salvage Yard	Weisenberg Township	RI/FS	F	03/06/87	1 89	2 89	-1
184.	3	PA	Heleva Landfill	North Whitehall Township	RA RI/FS	F F	03/28/88 09/28/88		1 90 1 90	new new
185.	3	PA	Hellertown Manufacturing Co.	Hellertown	RI/FS	PRP	02/22/88		2 91	new
186.	3	PA	Henderson Road	Upper Merion Township	RI/FS	PRP	04/01/88		2 90	new
187.	3	PA	Hranica Landfill	Buffalo Township	RI/FS	PRP	03/06/87	3 89	2 91	-7
188.	3	PA	Hunterstown Road	Straban Township	RI/FS	PRP	03/10/87	2 89	3 91	-9
189.	3	PA	Industrial Drive Site	Williams Township	RA RI/FS	F F	04/09/87 03/06/87	2 88 1 89	3 89 1 90	-5 -4
190.	3	PA	JW Rex Co./Allied Paint Manufacturing Co., Inc./Keystone Hydraulics	Lansdale	RI/FS	F	06/30/88		2 90	new
191.	3	PA	Keystone Sanitation Landfill	Union Township	RI/FS	F	06/30/87	2 89	4 90	-6
192.	3	PA	Lackawanna Refuse	Old Forge Borough	RA	F	06/02/87	1 90	4 89	1

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193.	3	PA	Lansdowne Radiation Site	Lansdowne	RA	F	03/26/87	1 89	1 90	-4
194.	3	PA	Middletown Air Field	Middletown	RA RI/FS	PRP F	06/15/88 03/15/88		2 90 2 90	new new
195.	3	PA	Moyers Landfill	Eagleville	RA	F	09/29/88		1 90	new
196.	3	PA	MW Manufacturing (once listed as Domino Salvage Yard)	Valley Township	RI/FS	F	03/06/87	4 89	2 89	2
197.	3	PA	Old City of York Landfill	Seven Valleys	RI/FS	PRP	10/21/87		4 89	new
198.	3	PA	Osborne Landfill	Grove City	RI/FS	FE	09/25/87	4 89	4 89	0
199.	3	PA	Palmerton Zinc Pile	Palmerton	RA RI/FS RI/FS	PRP PRP FE	07/31/88 09/24/85 12/21/87	3 88	4 90 4 90 3 91	new -9 new
200.	3	PA	Paoli Rail Yard	Paoli	RI/FS	PRP	05/27/87	1 89	4 91	-11
201.	3	PA	Reeser's Landfill	Upper Macungie Township	RI/FS	F	03/06/87	1 89	3 89	-2
202.	3	PA	Salford Quarry	Salford Township	RI/FS	PRP	03/22/88		2 90	new
203.	3	PA	Shriver's Corner	Straban Township	RI/FS	PRP	03/10/87	3 89	4 89	-1
204.	3	PA	Spra-Fin, Inc.	North Wales	RI/FS	F	06/30/88		2 90	new
205.	3	PA	Tysons Dump	Upper Merion Township	RA	PRP	06/03/88		4 90	new
206.	3	PA	Walsh Landfill	Honeybrook Township	RI/FS	S	02/09/84	4 88	3 89	-3
207.	3	PA	Westinghouse Elevator Co. Plant	Gettysburg	RI/FS	PRP	03/10/87	3 89	3 91	-8
208.	3	PA	Westline Site	Westline	RA	F	07/15/87	3 88	3 90	-8
209.	3	PA	Whitmoyer Laboratories	Jackson Township	RI/FS	F	11/01/87		2 90	new
210.	3	PA	William Dick Lagoons	West Caln Township	RI/FS	PRP	09/14/88		3 91	new

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211.	3	VA	Atlantic Wood Industries, Inc.	Portsmouth	RI/FS	PRP	07/23/87	2 89	1 91	-7
212.	3	VA	Avtex Fibers, Inc.	Front Royal	RI/FS	PRP	09/30/88		2 91	new
213.	3	VA	C & R Battery Co., Inc.	Chesterfield County	RI/FS	F	02/15/88		2 90	new
214.	3	VA	Chisman Creek	York County	RA	PRP	04/04/88	2 89	2 89	0
215.	3	VA	Defense General Supply Center	Chesterfield County	RI/FS	FF	08/15/87	2 89	1 90	-3
216.	3	VA	First Piedmont Corp. Rock Quarry (Route 719) (once listed as First Piedmont Corp. Rock Quarry)	Pittsylvania County	RI/FS	PRP	12/31/87		4 90	new
217.	3	VA	Greenwood Chemical Co.	Newtown	RI/FS	F	04/03/87	3 89	4 89	-1
218.	3	VA	H & H Inc., Burn Pit	Farrington	RI/FS	F	06/30/88		4 90	new
219.	3	VA	Rentokil, Inc. (Virginia Wood Preserving Divison)	Richmond	RI/FS	PRP	12/31/87		3 91	new
220.	3	VA	Rinehart Tire Fire Dump	Frederick County	RI/FS	F	09/28/88		2 90	new
221.	3	VA	Saltville Waste Disposal Ponds	Saltville	RI/FS	PRP	09/15/88		1 91	new
222.	3	VA	Saunders Supply Co.	Chuckatuck	RI/FS	F	09/18/87	3 89	3 90	-4
223.	3	WV	Leetown Pesticide	Leetown	RA	F	06/03/88		2 91	new
224.	3	WV	West Virginia Ordnance	Point Pleasant	RA	PRP	02/22/88		1 90	new
225.	4	AL	Alabama Army Ammunition Plant	Childersburg	RA RA	FF FF	08/31/86 03/31/87		1 88 1 94	new new
226.	4	AL	Anniston Army Depot (Southeast Industrial Area)	Anniston	RA RI/FS	FF FF	09/30/86 08/31/88		1 92 4 90	new new
227.	4	AL	Ciba-Geigy Corp. (McIntosh Plant)	McIntosh	RI/FS	FE	01/02/87	2 89	4 94	-22
228.	4	AL	Interstate Lead Co. (ILCO)	Leeds	RI/FS	FE	05/30/86	3 89	2 89	1

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229.	4	AL	Stauffer Chemical Co. (Cold Creek Plant)	Bucks	RI/FS	PRP	01/21/86	3 88	2 89	-3
230.	4	AL	Stauffer Chemical Co. (LeMoyne Plant)	Axis	RI/FS	PRP	01/21/86	3 88	2 89	-3
231.	4	FL	American Creosote Works, Inc. (Pensacola Plant) (once listed as American Creosote Works)	Pensacola	RI/FS	F	12/31/85	3 88	3 89	-4
232.	4	FL	Cabot/Koppers	Gainesville	RI/FS	PRP	11/17/87		4 89	new
233.	4	FL	City Industries, Inc.	Orlando	RI/FS	SE	09/20/84	3 89	1 90	-2
234.	4	FL	Davie Landfill (once listed as Broward County Solid Waste Disposal Facility)	Davie	RA	S	06/30/88		1 90	new
235.	4	FL	Dubose Oil Products Co.	Cantonment	RI/FS RI/FS	SE SE	10/26/87 10/26/87		2 90 2 90	new new
236.	4	FL	Harris Corp. (Palm Bay Plant) (once listed as Harris Corp./General Development Utilities)	Palm Bay	RI/FS	FE	03/31/88		3 89	new
237.	4	FL	Hollingsworth Solderless Terminal	Fort Lauderdale	RA	F	12/10/87		2 90	new
238.	4	FL	Kassauf-Kimerling Battery Disposal (once listed as Timber Lake Battery Disposal)	Tampa	RI/FS	SE	09/23/86	2 88	2 89	-4
239.	4	FL	Miami Drum Services (once listed as part of Biscayne Aquifer)	Miami	RA	F	09/30/88		1 90	new
240.	4	FL	Montco Research Products, Inc.	Hollister	RI/FS	FE	11/20/87		1 90	new
241.	4	FL	Munisport Landfill	North Miami	FS	FE	03/15/88		2 89	new
242.	4	FL	Northwest 58th Street Landfill (once listed as part of Biscayne Aquifer)	Miami	RA	PRP	07/15/88		3 89	new
243.	4	FL	Peak Oil Co./Bay Drum Co.	Tampa	RI/FS	PRP	03/01/88		4 90	new
244.	4	FL	Pepper Steel & Alloys, Inc.	Medley	RA	PRP	03/26/87	3 88	2 89	-3

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245.	4	FL	Petroleum Products Corp.	Pembroke Park	RI/FS	S	04/01/86		3 90	new
246.	4	FL	Pickettville Road Landfill	Jacksonville	RI/FS	PRP	09/30/84	4 88	4 89	-4
247.	4	FL	Reeves Southeast Galvanizing Corp.	Tampa	RI/FS	PRP	12/18/88		4 90	new
248.	4	FL	Sapp Battery Salvage	Cottondale	RA	F	09/30/88		1 91	new
249.	4	FL	Sherwood Medical Industries	Deland	RI/FS	PRP	04/30/87	1 90	1 91	-4
250.	4	FL	Sixty-Second Street Dump	Tampa	RI/FS	S	04/17/84	4 88	4 89	-4
251.	4	FL	Sydney Mine Sludge Ponds	Brandon	RI/FS	PRP	03/11/88		4 89	new
252.	4	FL	Taylor Road Landfill	Seffner	RI/FS	FE	04/30/87	1 90	3 90	-2
253.	4	FL	Yellow Water Road Dump	Baldwin	RI/FS	PRP	09/24/87		2 90	new
254.	4	GA	Hercules 009 Landfill	Brunswick	RI/FS	FE	07/15/88		1 91	new
255.	4	GA	Robins Air Force Base (Landfill #4/ Sludge Lagoon) (once listed as Robins Air Force Base)	Houston County	RI/FS	FF	12/31/86	4 88	3 90	-7
256.	4	KY	Distler Brickyard	West Point	RA	F	06/13/88		4 89	new
257.	4	KY	Distler Farm	Jefferson County	RA	F	09/30/88		4 89	new
258.	4	KY	Howe Valley Landfill	Howe Valley	RI/FS	PRP	04/15/88		2 90	new
259.	4	KY	Maxey Flats Nuclear Disposal	Hillsboro	RI/FS	PRP	03/24/87	2 89	3 89	-1
260.	4	KY	Smith's Farm	Brooks	RI/FS	F	04/03/87	1 90	3 89	2
261.	4	MS	Newsom Brothers/Old Reichhold Chemcials, Inc.	Columbia	RI/FS	F	04/28/86	4 88	3 89	-3
262.	4	NC	Aberdeen Pesticide Dumps	Aberdeen	RI/FS	F	06/30/87	1 89	1 91	-8
263.	4	NC	Bypass 601 Ground Water Contamination	Concord	RI/FS	F	04/09/87	1 90	1 90	0
264.	4	NC	Cape Fear Wood Preserving	Fayetteville	RI/FS	F	04/09/87	1 89	2 89	-1

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265.	4	NC	Carolina Transformer Co.	Fayetteville	RI/FS	F	04/07/88		1 91	new
266.	4	NC	Celanese Corp. (Shelby Fiber Operations)	Shelby	RI/FS	PRP	02/15/86	2 88	2 89	-4
267.	4	NC	Charles Macon Lagoon & Drum Storage	Cordova	RI/FS	PRP	04/13/88		3 90	new
268.	4	NC	Jadco-Hughes Facility	Belmont	RI/FS	PRP	09/30/86	2 89	2 90	-4
269.	4	NC	North Carolina State University (Lot 86, Farm Unit #1)	Raleigh	RI/FS	FE	04/18/87	1 89	4 90	-7
270.	4	NC	Potter's Septic Tank Service Pits	Maco	RI/FS	F	09/16/88		3 90	new
271.	4	SC	Carolawn, Inc.	Fort Lawn	RI/FS	PRP	07/01/85	2 88	3 89	-5
272.	4	SC	Golden Strip Septic Tank Service	Simpsonville	RI/FS	PRP	06/30/88		4 90	new
273.	4	SC	Kalama Specialty Chemicals	Beaufort	RI/FS	PRP	01/13/88	3 89	4 90	-5
274.	4	SC	Medley Farm Drum Dump	Gaffney	RI/FS	PRP	01/29/88		3 90	new
275.	4	SC	Palmetto Wood Preserving	Dixiana	RA	F	09/29/88		4 89	new
276.	4	SC	Sangamo Weston, Inc./Twelve-Mile Creek/ Lake Hartwell PCB Contamination	Pickens	RI/FS	PRP	06/18/87	2 89	3 90	-5
277.	4	SC	SCRDI Bluff Road	Columbia	RI/FS	PRP	04/21/88		2 90	new
278.	4	TN	Amnicola Dump	Chattanooga	RI/FS	EP	04/18/87	2 90	2 89	4
279.	4	TN	Arlington Blending & Packaging	Arlington	RI/FS	F	04/14/88		3 90	new
280.	4	TN	Lewisburg Dump	Lewisburg	RI/FS	PRP	12/31/87		1 90	new
281.	4	TN	Mallory Capacitor Co.	Waynesboro	RI/FS	PRP	12/18/88		3 90	new
282.	4	TN	Milan Army Ammunition Plant	Milan	RI/FS	FF	09/22/87	3 89	3 90	-4
283.	4	TN	Murray-Ohio Dump	Lawrenceburg	RI/FS	SE	05/15/87		1 90	new

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284.	5	IL	Acme Solvent Reclaiming, Inc.	Morristown	RI/FS	PRP	09/26/86	2	89	3	90	-5
285.	5	IL	Byron Salvage Yard	Byron	RI/FS	F	05/13/86	1	89	2	89	-1
286.	5	IL	Cross Brothers Pail Recycling (Pembroke)	Pembroke Township	RI/FS	S	05/04/83	1	89	4	89	-3
287.	5	IL	Kerr-McGee (Kress Creek/West Branch of DuPage River	DuPage County	RI/FS	FE	11/18/83			4	91	new
288.	5	IL	Kerr-McGee (Reed-Keppler Park)	West Chicago	RI/FS	FE	11/18/83			4	91	new
289.	5	IL	Kerr-McGee (Residential Areas)	West Chicago/ DuPage County	RI/FS	FE	11/18/83	1	89	4	91	-11
290.	5	IL	Kerr-McGee (Sewage Treat Plant)	West Chicago	RI/FS	FE	11/18/83	1	89	4	91	-11
291.	5	IL	LaSalle Electric Utilities	LaSalle	RA	S	07/27/87	1	90	1	90	0
292.	5	IL	NL Industries/Taracorp Lead Smelter	Granite City	RI/FS	PRP	03/11/85			2	90	new
293.	5	IL	Outboard Marine Corp.	Waukegan	RI/FS	F	09/21/87	1	89	*	*	*
294.	5	IL	Pagel's Pit	Rockford	RI/FS	PRP	08/27/86	1	89	3	90	-6
295.	5	IL	Parsons Casket Hardware Co.	Belvidere	RI/FS	S	09/29/88			1	91	new
296.	5	IL	Sangamo Electric Dump/Crab Orchard National Wildlife Refuge (USDOI)	Carterville	RI/FS	FF	02/26/86	4	88	4	89	-4
297.	5	IL	Sheffield (U.S. Ecology, Inc.)	Sheffield	RI/FS	PRP	10/14/85	1	89	1	91	-8
298.	5	IL	Tri-County Landfill Co./Waste Management of Illinois, Inc.	South Elgin	RI/FS	F	04/22/88			3	91	new
299.	5	IL	Wauconda Sand & Gravel	Wauconda	RI/FS	PRP	07/28/86			2	89	new
300.	5	IN	American Chemical Service, Inc.	Griffith	RI/FS	PRP	06/29/88			1	91	new
301.	5	IN	Columbus Old Municipal Landfill #1	Columbus	RI/FS	PRP	09/15/87	2	90	1	91	-3
302.	5	IN	Conrail Rail Yard (Elkhart)	Elkhart	RI/FS	F	09/29/88			3	91	new
303.	5	IN	Fisher-Calo	LaPorte	RI/FS	FE	09/29/84	1	89	2	90	-5

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304.	5	IN	Lake Sandy Jo (M & M Landfill) (once listed as Lake Sandy Jo)	Gary	RA RA	F F	09/28/87 08/29/88	2 89	2 91 1 90	-8 new
305.	5	IN	Main Street Well Field	Elkhart	RI/FS	F	09/29/86	1 89	3 90	-6
306.	5	IN	McCarty's Bald Knob Landfill	Mt. Vernon	RI/FS	F	07/19/88		1 91	new
307.	5	IN	MIDCO I	Gary	RI/FS	PRP	06/19/85	3 88	3 89	-4
308.	5	IN	MIDCO II	Gary	RI/FS	PRP	06/19/85	3 88	3 89	-4
309.	5	IN	Neal's Landfill (Bloomington)	Bloomington	RA	PRP	07/07/88		2 89	new
310.	5	IN	Ninth Avenue Dump	Gary	RI/FS	F	08/15/85	4 88	3 89	-3
311.	5	IN	Reilly Tar & Chemical Corp. (Indianapolis Plant)	Indianapolis	RI/FS	PRP	03/31/87	1 89	2 91	-9
312.	5	IN	Seymour Recycling Corp.	Seymour	RA	PRP	08/17/87	2 94	2 94	0
313.	5	IN	Tri-State Plating	Columbus	RI/FS	F	07/08/87	1 90	2 90	-1
314.	5	IN	Waste, Inc. Landfill	Michigan City	RI/FS	PRP	03/31/87	4 89	3 91	-7
315.	5	IN	Wayne Waste Oil	Columbia City	RI/FS	PRP	08/14/87	4 89	2 90	-2
316.	5	IN	Wedzeb Enterprises, Inc.	Lebanon	RI/FS	FE	05/29/86	1 89	4 89	-3
317.	5	MI	Adam's Plating	Lansing	RI/FS	F	09/28/88		4 91	new
318.	5	MI	American Anodco, Inc.	Ionia	RI/FS	PRP	10/23/87		2 90	new
319.	5	MI	Anderson Development Co.	Adrian	RI/FS	PRP	05/23/86	1 89	2 91	-9
320.	5	MI	Auto Ion Chemicals, Inc.	Kalamazoo	RI/FS	PRP	06/18/86	2 89	4 89	-2
321.	5	MI	Berlin & Farro	Swartz Creek	RI/FS	PRP	02/27/86	1 89	4 89	-3
322.	5	MI	Bofors Nobel, Inc.	Muskegon	RI/FS	S	06/07/88		1 91	new
323.	5	MI	Burrows Sanitation	Hartford	RA	F	09/30/88		4 90	new
324.	5	MI	Butterworth #2 Landfill	Grand Rapids	RI/FS	PRP	04/22/87	4 89	3 90	-3

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.	PRESENT QTR. EST. COMPLETION	STATUS
325.	5	MI	Cannelton Industries, Inc.	Sault Sainte Marie	RI/FS	F	09/27/88		2 91	new
326.	5	MI	Cemetery Dump	Rose Center	RA RI/FS	S S	06/19/87 06/13/85	2 89 3 88	2 89 4 89	0 -5
327.	5	MI	Chem Central	Wyoming Township	RI/FS	PRP	06/30/87	4 89	4 90	-4
328.	5	MI	Clare Water Supply	Clare	RI/FS	PRP	09/27/85	1 89	4 90	-7
329.	5	MI	Cliff/Dow Dump	Marquette	RI/FS	PRP	09/28/84	2 88	2 89	-4
330.	5	MI	Duell & Gardner Landfill	Dalton Township	RI/FS	S	04/08/87	1 90	4 90	-3
331.	5	MI	Electrovoice	Buchanan	RI/FS	PRP	10/08/87	1 88	1 91	-12
332.	5	MI	Folkertsma Refuse	Grand Rapids	RI/FS	FE	05/16/88		4 91	new
333.	5	MI	Ford Motor Co. (Sludge Lagoon)	Ypsilanti	RI/FS	PRP	09/28/88		3 91	new
334.	5	MI	Forest Waste Products	Otisville	RA	PRP	06/28/88		3 89	new
335.	5	MI	G&H Landfill	Utica	RI/FS	F	07/01/83	3 89	4 90	-5
336.	5	MI	Grand Traverse Overall Supply Co.	Greilickville	RI/FS	FE	03/05/87	2 89	3 91	-9
337.	5	MI	Hedblum Industries	Oscoda	RI/FS	FE	05/21/86	1 89	4 89	-3
338.	5	MI	Hi-Mill Manufacturing Co.	Highland	RI/FS	PRP	09/23/88		3 91	new
339.	5	MI	H. Brown Co., Inc.	Grand Rapids	RI/FS	F	08/19/88		1 91	new
340.	5	MI	Ionia City Landfill	Ionia	RI/FS	PRP	01/29/86	1 89	4 89	-3
341.	5	MI	Kentwood Landfill	Kentwood	RI/FS	PRP	12/13/85	4 88	4 89	-4
342.	5	MI	K&L Avenue Landfill	Oshtemo Township	RI/FS	FE	09/26/84	2 89	1 90	-3
343.	5	MI	Mason County Landfill	Pere Marquette Township	RI/FS	F	09/28/88		2 92	new
344.	5	MI	Metal Working Shop	Lake Ann	RI/FS	F	09/30/88		2 91	new

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.	PRESENT QTR. EST. COMPLETION	STATUS
345.	5	MI	Metamora Landfill	Metamora	RA RI/FS	S S	02/17/88 09/30/86	 3 88	4 92 1 90	new -6
346.	5	MI	Michigan Disposal Service (Cork Street Landfill)	Kalamazoo	RI/FS	PRP	12/03/87		4 90	new
347.	5	MI	Motor Wheel, Inc.	Lansing	RI/FS	PRP	08/07/87	4 89	1 91	-5
348.	5	MI	North Bronson Industrial Area	Bronson	RI/FS	S	06/24/87	4 89	4 91	-8
349.	5	MI	Northernaire Plating	Cadillac	RA RI/FS	S S	06/23/87 09/26/83	2 88 1 89	2 89 3 89	-4 -2
350.	5	MI	Organic Chemicals, Inc.	Grandville	RI/FS	F	04/22/88		2 91	new
351.	5	MI	Ossineke Ground Water Contamination	Ossineke	RI/FS	F	09/21/87	2 90	4 90	-2
352.	5	MI	Ott/Story/Cordova Chemical Co.	Dalton Township	RI/FS	FE	08/19/83	1 89	1 90	-4
353.	5	MI	Pacakging Corp. of America	Filer City	RI/FS	PRP	05/02/85	3 88	3 89	-4
354.	5	MI	Petoskey Municipal Well Field	Petoskey	RI/FS	PRP	06/08/87	4 89	2 90	-2
355.	5	MI	Rasmussen's Dump	Green Oak Township	RI/FS	S	05/30/84	2 88	3 89	-5
356.	5	MI	Rockwell International Corp. (Allegan Plant)	Allegan	RI/FS	PRP	06/07/88		2 91	new
357.	5	MI	Roto-Finish Co., Inc.	Kalamazoo	RI/FS	PRP	12/18/87		1 91	new
358.	5	MI	Shiawassee River	Howell	RI/FS	S	06/19/87	4 89	4 90	-4
359.	5	MI	South Macomb Disposal Authority (Landfills #9 and #9a)	Macomb Township	RI/FS	FE	09/01/87	3 89	2 91	-7
360.	5	MI	Spiegelberg Landfill	Green Oak Township	RI/FS	S	06/26/87	2 88	3 89	-5
361.	5	MI	Springfield Township Dump	Davisburg	RI/FS	F	03/11/88		2 89	new
362.	5	MI	Sturgis Municipal Wells	Sturgis	RI/FS	S	06/24/87	4 89	4 90	-4
363.	5	MI	Tar Lake	Mancelona Township	RI/FS	PRP	01/29/86	1 89	1 91	-8
364.	5	MI	Thermo-Chem, Inc.	Muskegon	RI/FS	PRP	09/21/87	4 89	4 91	-8

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.	PRESENT QTR. EST. COMPLETION	STATUS
365.	5	MI	Torch Lake	Houghton County	RI/FS	F	09/28/88		1 92	new
366.	5	MI	Verona Well Field	Battle Creek	RA RI/FS	F F	09/29/86 05/30/85	1 89	4 91 3 90	-11 new
367.	5	MI	Wash King Laundry	Pleasant Plains Twp	RI/FS	S	09/10/87	1 90	1 91	-4
368.	5	MI	Whitehall Municipal Wells	Whitehall	RI/FS	F	04/22/88		2 90	new
369.	5	MN	Adrian Municipal Well Field	Adrian	RI/FS	S	09/30/85	1 89	3 89	-2
370.	5	MN	Burlington Northern (Brainerd/Baxter Plant)	Brainerd/Baxter	RA RA RA	PRP PRP PRP	05/15/86 05/15/86 05/15/86	1 92 1 92 1 92	1 92 1 92 1 92	0 0 0
371.	5	MN	FMC Corp. (Fridley Plant)	Fridley	RA RA	PS PRP	12/05/87 05/25/83		1 93 4 83	new new
372.	5	MN	General Mills/Henkel Corp.	Minneapolis	RI/FS	OH	10/23/84		* *	new
373.	5	MN	Koch Refining Co./N-Ren Corp.	Pine Bend	RI/FS	OH	10/15/85		4 88	new
374.	5	MN	Kummer Sanitary Landfill	Bemidji	RA	S	07/08/85	1 89	4 89	-3
375.	5	MN	Kurt Manufacturing Co.	Fridley	RA	PS	12/15/86		* *	new
376.	5	MN	LaGrand Sanitary Landfill	LaGrand Township	RI/FS	S	06/30/87	1 89	1 91	-8
377.	5	MN	Lehillier/Mankato Site	Lehillier/Mankato	RA	S	03/31/88		4 91	new
378.	5	MN	MacGillis & Gibbs Co./Bell Lumber & Pole Co.	New Brighton	RI/FS	S	09/29/87	1 89	1 91	-8
379.	5	MN	New Brighton/Arden Hills	New Brighton	FS RA RA	FF F S	08/12/87 09/30/87 09/30/88	2 89 4 89	1 91 1 90 4 89	-7 -1 new
380.	5	MN	Oak Grove Sanitary Landfill	Oak Grove Towsnship	RI/FS	S	06/13/85	3 88	1 90	-6
381.	5	MN	Oakdale Dump	Oakdale	RA	PRP	11/10/83		* *	new
382.	5	MN	Pine Bend Sanitary Landfill (once listed as Pine Bend Sanitary Landfill/Crosby	Dakota County	RI/FS	OH	04/15/85		4 89	new

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.		PRESENT QTR. EST. COMPLETION		STATUS
			American Demolition Landfill)									
383.	5	MN	Reilly Tar & Chemical Corp. (St. Louis Park Plant)	St. Louis Park	RA	PRP	09/30/87	2	88	4	88	-2
					RI/FS	PRP	09/04/86	3	89	1	91	-6
					RI/FS	PRP	09/04/86	3	89	3	90	-4
384.	5	MN	Ritari Post & Pole	Sebeka	RI/FS	S	06/30/87	3	89	1	91	-6
385.	5	MN	St. Louis River Site	St. Louis County	RI/FS	S	09/30/85	1	89	4	90	-7
386.	5	MN	University of Minnesota (Rosemount Research Center)	Rosemount	RA	PS	09/02/87			1	90	new
387.	5	MN	Washington County Landfill	Lake Elmo	RA	PRP	10/24/84			4	99	new
388.	5	OH	Allied Chemical & Ironton Coke	Ironton	RI/FS	PRP	04/12/84	4	88	3	90	-7
389.	5	OH	Alsco Anaconda	Gnadenhutten	RI/FS	PRP	01/26/87	3	89	3	89	0
390.	5	OH	Big D Campground	Kingsville	RI/FS	FE	05/20/86	2	89	3	89	-1
391.	5	OH	Bowers Landfill	Circleville	RI/FS	PRP	01/15/85	4	88	2	89	-2
392.	5	OH	Buckeye Reclamation	St. Clairsville	RI/FS	PRP	10/31/85	1	89	4	89	-3
393.	5	OH	E.H. Schilling Landfill	Hamilton Township	RI/FS	PRP	03/31/87	3	89	4	89	-1
394.	5	OH	Fultz Landfill	Jackson Township	RI/FS	F	09/24/84	1	89	4	90	-7
395.	5	OH	General Electric Co. (Coshocton Plant)	Coshocton	RI/FS	PRP	08/28/87	3	89	1	91	-6
396.	5	OH	Industrial Excess Landfill	Uniontown	RI/FS	F	12/28/84			3	89	new
397.	5	OH	Laskin/Poplar Oil Co. (once listed as Poplar Oil Co.)	Jefferson Township	RI/FS	F	07/27/83	1	88	*	*	*
398.	5	OH	Miami County Incinerator	Troy	RI/FS	FE	03/30/84	4	88	3	89	-3
399.	5	OH	Nease Chemical	Salem	RI/FS	PRP	01/27/88			4	90	new
400.	5	OH	New Lyme Landfill	New Lyme	RA	F	04/11/88			4	89	new
401.	5	OH	Old Mill (once listed as Rock Creek/Jack Webb)	Rock Creek	RA	F	09/21/87	3	90	1	90	2

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.	PRESENT QTR. EST. COMPLETION	STATUS
402.	5	OH	Ormet Corp.	Hannibal	RI/FS	PRP	03/27/87	2 89	3 90	-5
403.	5	OH	Powell Road Landfill	Dayton	RI/FS	PRP	11/12/87		3 90	new
404.	5	OH	Sanitary Landfill Co. (Industrial Waste Disposal Co., Inc.)	Dayton	RI/FS	PRP	12/16/87		1 91	new
405.	5	OH	Skinner Landfill	West Chester	RI/FS	F	09/26/84	1 89	2 90	-5
406.	5	OH	South Point Plant	South Point	RI/FS	PRP	03/31/87	1 89	4 90	-7
407.	5	OH	Van Dale Junkyard	Marietta	RI/FS	PRP	07/24/87	4 89	3 90	-3
408.	5	OH	Zanesville Well Field	Zanesville	RI/FS	PRP	06/03/88		3 90	new
409.	5	WI	Algoma Municipal Landfill	Algoma	RI/FS	PRP	01/28/88		3 90	new
410.	5	WI	City Disposal Corp. Landfill	Dunn	RI/FS	PRP	05/22/87	3 90	4 91	-5
411.	5	WI	Fadrowski Drum Disposal	Franklin	RI/FS	PRP	05/11/87	2 90	1 91	-3
412.	5	WI	Hagen Farm	Stoughton	RI/FS	PRP	07/27/87	4 89	3 91	-7
413.	5	WI	Hunts Disposal Landfill	Caledonia	RI/FS	FE	09/17/87	3 89	4 90	-5
414.	5	WI	Janesville Ash Beds	Janesville	RI/FS	PRP	09/30/86	4 89	4 89	0
415.	5	WI	Janesville Old Landfill	Janesville	RI/FS	PRP	09/30/86	4 89	4 89	0
416.	5	WI	Kohler Co. Landfill	Kohler	RI/FS	PRP	09/30/85		4 90	new
417.	5	WI	Lemberger Landfill, Inc. (once listed as Lemberger Fly Ash Landfill)	Whitelaw	RI/FS	F	06/30/87	3 89	3 90	-4
418.	5	WI	Lemberger Transport & Recycling	Franklin Township	RI/FS	F	06/30/87	1 90	3 90	-2
419.	5	WI	Master Disposal Service Landfill	Brookfield	RI/FS	PRP	06/19/86	2 90	2 90	0
420.	5	WI	Moss-American (Kerr-McGee Oil Co.)	Milwaukee	RI/FS	FE	09/30/85	1 89	3 90	-6
421.	5	WI	Muskego Sanitary Landfill	Muskego	RI/FS	PRP	08/14/87	4 89	4 90	-4
422.	5	WI	National Presto Industries, Inc.	Eau Claire	RI/FS	PRP	06/04/86	1 89	2 90	-5

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.	PRESENT QTR. EST. COMPLETION	STATUS
423.	5	WI	Northern Engraving Co.	Sparta	RA	PRP	06/21/88		4 89	new
424.	5	WI	N.W. Mauthe Co., Inc.	Appleton	RI/FS	S	09/30/88		2 91	new
425.	5	WI	Oconomowoc Electroplating Co., Inc.	Ashippin	RI/FS	F	03/30/87	3 89	2 90	-3
426.	5	WI	Onalaska Municpal Landfill	Onalaska	RI/FS	F	04/08/88		4 90	new
427.	5	WI	Schmalz Dump	Harrison	RA RA	F F	06/30/87 09/29/88	1 88	1 89 2 90	-4 new
428.	5	WI	Sheboygan Harbor & River	Sheboygan	RI/FS	PRP	04/11/86	2 89	4 91	-10
429.	5	WI	Spickler Landfill	Spencer	RI/FS	PRP	07/07/88		1 92	new
430.	5	WI	Stoughton City Landfill	Stoughton	RI/FS	PRP	04/15/88		1 91	new
431.	5	WI	Wausau Ground Water Contamination	Wausau	RI/FS	F	09/30/88		4 89	new
432.	5	WI	Wheeler Pit	La Prarie Township	RI/FS	PRP	11/25/87		3 91	new
433.	6	AR	Arkwood, Inc.	Omaha	RI/FS	PRP	05/15/86	4 93	3 90	13
434.	6	AR	Cecil Lindsey	Newport	RA	F	04/23/87	1 89	2 89	-1
435.	6	AR	Jacksonville Municipal Landfill	Jacksonville	RI/FS	F	04/15/88		4 90	new
436.	6	AR	Mid-South Wood Products	Mena	RA	PRP	03/24/88		4 91	new
437.	6	AR	Rogers Road Municipal Landfill	Jacksonville	RI/FS	F	04/15/88		4 90	new
438.	6	AR	Vertac, Inc.	Jacksonville	FS RI/FS	F F	04/19/88 09/23/83	 4 88	3 89 3 89	new -3
439.	6	LA	Bayou Sorrel Site	Bayou Sorrel	RA	PRP	07/11/88		3 91	new
440.	6	LA	Old Inger Oil Refinery	Darrow	RA	S	04/25/86	2 94	2 94	0
441.	6	LA	Petro-Processors of Louisiana, Inc.	Scotlandville	RA	PRP	06/30/87	2 90	4 91	-6

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.	PRESENT QTR. EST. COMPLETION	STATUS
442.	6	NM	Homestake Mining Co.	Milan	RI/FS	PRP	06/30/87	4 89	4 89	0
443.	6	NM	South Valley	Albuquerque	RI/FS	PRP	09/28/84	3 88	2 89	-3
444.	6	OK	Hardage/Criner (once listed as Criner/ Hardage Waste Disposal)	Criner	RI/FS	PRP	02/20/88	1 88	2 90	-9
445.	6	OK	Tenth Street Dump/Junkyard	Oklahoma City	RI/FS	F	09/29/88		4 90	new
446.	6	TX	Crystal Chemical Co.	Houston	RI/FS	PRP	04/28/87	4 88	3 90	-7
447.	6	TX	Geneva Industries/Fuhrmann Energy	Houston	RA	S	12/18/87		4 90	new
448.	6	TX	Motco, Inc.	La Marque	RI/FS	PRP	03/17/87	3 88	4 89	-5
449.	6	TX	Odessa Chromium #1	Odessa	RA	S	12/21/87		1 91	new
450.	6	TX	Odessa Chromium #2 (Andrews Highway)	Odessa	RA	S	12/21/87		2 89	new
451.	6	TX	Petro-Chemical Systems, Inc. (Turtle Bayou)	Liberty County	RI/FS	S	09/26/88		1 91	new
					RA	F	01/14/88		2 89	new
452.	6	TX	Sheridan Disposal Services	Hempstead	RI/FS	PRP	02/03/87	4 89	4 89	0
453.	6	TX	Texarkana Wood Preserving Co.	Texarkana	RI/FS	S	03/31/87	2 90	2 90	0
454.	6	TX	United Creosoting Co.	Conroe	RA	F	04/16/87	2 88	4 89	-6
					RA	S	06/28/88		3 90	new
					RI/FS	S	06/30/87	2 89	4 89	-2
455.	7	IA	Chemplex Co.	Clinton/Camanche	RI/FS	PRP	09/08/87	4 89	4 89	0
456.	7	IA	Des Moines TCE (once listed as DICO)	Des Moines	RA	F	09/30/87	1 89	1 90	-4
					RI/FS	F	08/24/88		4 90	new
					RA	PRP	09/30/87	2 88	4 94	-26
457.	7	IA	Midwest Manufacturing/North Farm	Kellogg	RI/FS	F	09/23/88		1 90	new
458.	7	IA	Red Oak City Landfill	Red Oak	RI/FS	F	04/24/87	2 89	4 89	-2
459.	7	IA	Shaw Avenue Dump	Charles City	RI/FS	PRP	05/26/88		4 89	new

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.	PRESENT QTR. EST. COMPLETION	STATUS
460.	7	IA	White Farm Equipment Co. Dump	Charles City	RI/FS	F	09/30/88		2 89	new
461.	7	KS	Arkansas City Dump	Arkansas City	RI/FS	S	05/21/86	4 88	3 89	-3
462.	7	KS	Cherokee County (once listed as Tar Creek, Cherokee County)	Cherokee County	RI/FS RI/FS RI/FS	F F F	12/19/86 12/17/87 03/23/88	2 88	3 89 1 91 1 91	-5 new new
463.	7	KS	Doepke Disposal (Holliday)	Johnson County	RI/FS	PRP	12/15/87		4 89	new
464.	7	MO	Bee Cee Manufacturing Co.	Malden	RI/FS	S	09/30/88		3 90	new
465.	7	MO	Kem-Pest Laboratories	Cape Girardeau	RI/FS	F	05/05/87	2 90	4 89	2
466.	7	MO	Lake City Army Ammunition Plant (Northwest Lagoon)	Independence	RI/FS	FF	03/19/87		1 91	new
467.	7	MO	Minker/Stout/Romaine Creek (once listed as Area 2: Fills 1 and 2)	Imperial	RA RA RA	F F F	05/10/83 05/24/88 06/08/88	1 89	3 89 3 89 4 89	-2 new new
468.	7	MO	North-U Drive Well Contamination	Springfield	RI/FS	S	09/27/85	1 90	1 91	-4
469.	7	MO	Shenandoah Stables (once listed as Arena 1: Shenandoah Stables)	Moscow Mills	RA	F	08/18/88		2 89	new
470.	7	MO	Solid State Circuits, Inc.	Republic	RI/FS	PS	11/20/86	4 88	4 89	-4
471.	7	MO	Times Beach Site	Times Beach	RA RA	F F	03/14/83 05/02/88		3 89 2 89	new new
472.	7	MO	Valley Park TCE	Valley Park	RI/FS	S	12/31/87		1 91	new
473.	7	MO	Weldon Spring Quarry (USDOE/Army)	St. Charles County	RI/FS FS	FF FF	08/22/86 07/15/88	1 90	3 91 3 90	-6 new
474.	7	MO	Wheeling Disposal Service Co. Landfill	Amazonia	RI/FS	PRP	09/29/88		3 90	new

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475.	7	NE	Hastings Ground Water Contamination	Hastings	RI	F	03/12/85			3	89	new
					RI/FS	FF	06/15/86	1	89	2	90	-5
					RI/FS	F	10/15/86	3	90	1	91	-2
					RI/FS	F	03/25/87	1	89	1	91	-8
					RI/FS	F	10/01/87	4	88	4	89	-4
					RI/FS	F	04/18/88			1	90	new
476.	8	CO	California Gulch	Leadville	RA	PRP	09/07/88			2	89	new
					RI/FS	FE	04/07/87	2	89	3	90	-5
477.	8	CO	Central City-Clear Creek	Idaho Springs	FS	S	09/01/86	3	88	2	91	-11
478.	8	CO	Denver Radium Site	Denver	RA	F	03/29/88			4	89	new
					RA	F	03/31/88			1	90	new
					RI	S	03/31/88			3	89	new
479.	8	CO	Lowry Landfill	Arapahoe County	RI	FE	06/01/87			4	89	new
480.	8	CO	Martin-Marietta (Denver Aerospace)	Waterton	RI/FS	PRP	06/12/88	1	89	2	90	-5
481.	8	CO	Rocky Flats Plant (USDOE)	Golden	RI/FS	FF	07/31/86	3	88	4	89	-5
482.	8	CO	Rocky Mountain Arsenal	Adams County	RA	S	07/01/87			3	89	new
					RA	FF	01/29/88			3	89	new
					RA	FF	06/28/88			4	89	new
					RA	FF	09/20/88			2	90	new
					RI	FE	10/27/87			3	89	new
					RI/FS	FF	02/15/85	4	99	2	93	26
					RI/FS	FF	02/15/85	4	99	3	90	37
483.	8	CO	Sand Creek Industrial	Commerce City	RI/FS	FE	09/23/83	4	88	2	89	-2
484.	8	CO	Smuggler Mountain	Pitkin County	FS	F	09/07/88			2	89	new
485.	8	CO	Woodbury Chemical Co.	Commerce City	RI/FS	PRP	12/18/87			4	89	new
486.	8	MT	Anaconda Co. Smelter	Anaconda	RI/FS	PRP	09/28/88			1	91	new
					RI/FS	PRP	09/28/88			2	93	new
487.	8	MT	Burlington Northern Railroad (Somers Tie-Treating Plant)	Somers	RI/FS	PRP	10/09/85	1	89	2	89	-1

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.	PRESENT QTR. EST. COMPLETION	STATUS
488.	8	MT	East Helena Site (once listed as East Helena Smelter)	East Helena	FS	F	04/02/87		3 89	new
					FS	PRP	06/23/87	1 89	2 91	-9
					RI	PRP	11/15/84		3 89	new
					RI/FS	PRP	06/23/87		2 91	new
489.	8	MT	Idaho Pole Co.	Bozeman	RI/FS	S	09/25/87		1 92	new
					RI/FS	S	09/25/87		1 92	new
					RI/FS	S	09/25/87		1 92	new
490.	8	MT	Milltown Reservoir Sediments	Milltown	FS	FE	12/07/87		1 91	new
					RI	S	03/11/85		3 89	new
					RI/FS	FE	12/07/87		3 91	new
491.	8	MT	Montana Pole and Treating	Butte	RI/FS	S	03/23/88		2 92	new
					RI/FS	S	03/23/88		2 92	new
					RI/FS	S	03/23/88		2 92	new
492.	8	MT	Silver Bow Creek/Butte Area (once listed as Silver Bow Creek)	Silver Bow/ Deer Lodge	RI/FS	S	09/29/83	3 90	2 92	-7
					RI/FS	S	01/29/87		3 89	new
					RI/FS	S	05/27/88		2 92	new
					RI/FS	S	05/27/88		2 92	new
					RI/FS	FE	06/27/88		2 92	new
					RI/FS	S	09/07/88		1 92	new
493.	8	UT	Hill Air Force Base	Ogden	RI/FS	FF	02/14/86	4 90	2 92	-6
					RI/FS	FF	08/15/87		3 91	new
					RI/FS	FF	11/13/87		1 92	new
					RI/FS	FF	02/24/87		2 91	new
494.	8	UT	Monticello Radioactively Contaminated Properties	Monticello	RI/FS	PRP	09/06/84		4 89	new
495.	8	UT	Ogden Defense Depot	Ogden	RI/FS	FF	06/30/86	1 89	3 90	-6
496.	8	UT	Olson/Neihart Reservoir	Wastach County	RI/FS	S	12/31/84	1 89	* *	*
497.	8	UT	Portland Cement (Kiln Dust 2 & 3)	Salt Lake City	RI/FS	PS	11/21/85		4 89	new
498.	8	UT	Richardson Flat Tailings	Summit County	RI/FS	S	09/29/88		3 91	new
499.	8	UT	Sharon Steel Corp. (Midvale Tailings) (once listed as Sharon Steel Corp. (Midvale Smelter))	Midvale	RI/FS	FE	12/31/84	1 89	4 89	-3

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.	PRESENT QTR. EST. COMPLETION	STATUS
500.	8	UT	Wasatch Chemical Co.	Salt Lake City	RI/FS	PS	09/28/88	1 90	2 90	-1
501.	8	WY	Mystery Bridge Rd./U.S. Highway 20	Evansville	RI/FS	PRP	07/01/88		2 90	new
502.	9	AZ	Apache Powder Co.	St. David	RI/FS	F	06/13/88		2 91	new
503.	9	AZ	Hassayampa Landfill	Hassayampa	RI/FS	PRP	02/19/88		4 91	new
504.	9	AZ	Indian Bend Wash Area	Scottsdale/ Tempe/Phoenix	RI/FS	F	02/22/84	4 89	2 90	-2
505.	9	AZ	Litchfield Airport Area	Goodyear/Avondale	RI/FS RI/FS RI/FS	FE PRP PRP	09/23/83 03/19/85 03/05/85	2 89 4 88 4 88	4 89 4 89 4 89	-2 -4 -4
506.	9	AZ	Mesa Area Gound Water Contamination	Mesa	RI/FS	PRP	10/01/86	1 89	3 90	-6
507.	9	AZ	Nineteenth Avenue Landfill	Phoenix	RI/FS	PS	07/25/86	3 88	4 89	-5
508.	9	CA	Advanced Micro Devices, Inc.	Sunnyvale	RI/FS	PS	01/02/82	2 88	4 90	-10
509.	9	CA	Aerojet General Corp.	Rancho Cordova	RI/FS	PRP	09/08/88		4 94	new
510.	9	CA	Applied Materials	Santa Clara	RI/FS	PS	10/01/83		4 89	new
511.	9	CA	Atlas Asbestos Mine	Fresno County	RI/FS	F	09/21/84	1 89	4 89	-3
512.	9	CA	Beckman Instruments (Porterville Plant)	Porterville	RI/FS	PRP	02/20/87	2 89	4 89	-2
513.	9	CA	Castle Air Force Base	Merced	RI/FS RI/FS	FF FF	09/07/88 10/15/84	 3 88	4 90 1 92	new -14
514.	9	CA	Celtor Chemical Works	Hoopa	RA	F	11/17/87	2 89	1 89	1
515.	9	CA	Coalinga Asbestos Mine	Coalinga	RI/FS	PRP	11/16/87		4 89	new
516.	9	CA	Coast Wood Preserving	Ukiah	RI/FS	PS	05/01/84	3 88	4 89	-5
517.	9	CA	Del Norte Pesticide Storage	Crescent City	RA	F	04/20/88		4 89	new

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.	PRESENT QTR. EST. COMPLETION	STATUS
518.	9	CA	Fairchild Semiconductor Corp. (Mountain View Plant) (once listed as Fairchild Camera & Instrument Corp. (Mountain View Plant))	Mountain View	RI/FS	PRP	08/15/85	4 88	3 89	-3
519.	9	CA	Fairchild Semiconductor Corp. (South San Jose Plant) (once listed as Fairchild Camera & Instrument Corp. (South San Jose Plant))	South San Jose	RI/FS	PS	04/10/82	2 88	2 89	-4
520.	9	CA	Firestone Tire & Rubber Co. (Salinas Plant)	Salinas	RI/FS	PS	10/16/85	1 90	4 89	1
521.	9	CA	FMC Corp. (Fresno Plant)	Fresno	RI/FS	PRP	02/05/87	1 90	1 91	-4
522.	9	CA	Hewlett-Pacakard	Palo Alto	RI/FS	PS	04/01/83	4 88	4 90	-8
523.	9	CA	Intel Corp. (Mountain View Plant)	Mountain View	RI/FS	PRP	08/15/85	4 88	3 89	-3
524.	9	CA	Intel Corp. (Santa Clara III)	Santa Clara	RI/FS	PS	06/01/82	1 89	1 91	-8
525.	9	CA	Intel Magnetics	Santa Clara	RI/FS	PS	06/01/82	1 89	3 91	-10
526.	9	CA	Iron Mountain Mine	Redding	RA RI/FS	F F	05/01/88 03/28/87	3 89	3 89 2 93	new -15
527.	9	CA	J.H. Baxter & Co.	Weed	RI/FS	FE	03/14/87	4 89	3 90	-3
528.	9	CA	Koppers Co., Inc. (Oroville Plant)	Oroville	RI/FS	PRP	04/25/86	1 89	4 89	-3
529.	9	CA	Lawrence Livermore National Laboratory (USDOE)	Livermore	RI/FS	FF	03/25/87	3 91	3 91	0
530.	9	CA	Liquid Gold Oil Corp.	Richmond	RI/FS	PS	09/20/83	4 88	1 91	-9
531.	9	CA	Lorentz Barrel & Drum Co.	San Jose	RI/FS	F	02/17/88		3 90	new
532.	9	CA	Louisiana-Pacific Corp.	Oroville	RI/FS RI/FS	F PRP	11/15/86 02/08/88	1 90	2 90 2 90	-1 new
533.	9	CA	Marley Cooling Tower Co.	Stockton	RI/FS	SE	02/01/85	1 90	1 90	0

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.	PRESENT QTR. EST. COMPLETION	STATUS
534.	9	CA	McColl	Fullerton	RA RI/FS	S F	06/11/84 02/03/86	1 89	2 90 4 89	-5 new
535.	9	CA	Moffett Naval Air Station	Sunnyvale	RI/FS	FF	05/20/88		2 92	new
536.	9	CA	Monolithic Memories	Sunnyvale	RI/FS	PS	05/01/82	1 89	2 91	-9
537.	9	CA	Montrose Chemical Corp.	Torrance	RI/FS	PRP	10/10/86	2 89	2 91	-8
538.	9	CA	National Semiconductor Corp.	Santa Clara	RI/FS	PS	02/01/82	1 89	2 91	-9
539.	9	CA	Norton Air Force Base	San Bernardino	RI/FS RI/FS	FF FF	10/01/86 10/01/86	4 89	4 90 1 92	-4 new
540.	9	CA	Operating Industries, Inc. Landfill	Monterey Park	RA RI	F FE	08/01/87 06/28/86	1 90	4 89 3 89	1 new
541.	9	CA	Purity Oil Sales, Inc.	Malaga	RI/FS	F	12/31/85	4 88	4 89	-4
542.	9	CA	Raytheon Corp.	Mountain View	RI/FS	PRP	08/15/85	4 88	3 89	-3
543.	9	CA	Rhone-Poulenc, Inc./Zoecon Corp. (once listed as Zoecon Corp./ Rhone-Poulenc, Inc.)	East Palo Alto	RI/FS	PS	08/27/87	1 90	4 90	-3
544.	9	CA	Sacramento Army Depot	Sacramento	RI/FS	FF	11/01/87		4 89	new
545.	9	CA	San Fernando Valley (Area 1)	Los Angeles	RA RI/FS RI/FS	S S S	08/06/87 08/16/85 01/15/88	1 89 2 89	2 89 4 92 2 89	-1 -14 new
546.	9	CA	San Fernando Valley (Area 2)	Los Angeles/Glendale	RI/FS	S	08/16/85	2 89	4 92	-14
547.	9	CA	San Fernando Valley (Area 3)	Glendale	RI/FS	S	07/20/87		4 92	new
548.	9	CA	San Fernando Valley (Area 4)	Los Angeles	RI/FS	S	07/20/87		4 92	new
549.	9	CA	San Gabriel Valley (Area 4)	La Puente	RI/FS RI/FS	F F	03/22/84 04/01/87	4 92	4 93 2 90	-4 new
550.	9	CA	San Gabriel Valley (Area 1)	El Monte	RI/FS RI/FS RI/FS	F S F	03/22/84 09/30/85 04/01/87	4 92	4 93 4 93 2 90	-4 new new

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.	PRESENT QTR. EST. COMPLETION	STATUS
					RA	F	05/25/88		2 89	new
551.	9	CA	San Gabriel Valley (Area 2)	Baldwin Park Area	RI/FS	F	03/22/84	4 92	4 93	-4
					RI/FS	F	04/01/87	4 88	2 90	-6
					RI/FS	F	08/01/87	4 88	4 90	-8
552.	9	CA	San Gabriel Valley (Area 3)	Alhambra	RI/FS	F	03/22/84	4 92	4 93	-4
553.	9	CA	Signetics, Inc.	Sunnyvale	RI/FS	PS	01/02/82	2 88	4 90	-10
554.	9	CA	South Bay Asbestos Area (once listed as Alviso Dumping Area)	Alviso	RI/FS	F	07/11/85	1 89	3 89	-2
555.	9	CA	Southern California Edison Co. (Visalia Poleyard)	Visalia	RI/FS	PS	12/18/87		1 91	new
556.	9	CA	Southern Pacific Transportation	Roseville	RI/FS	PRP	12/21/87		4 91	new
557.	9	CA	Stringfellow	Glen Avon Heights	RA	PRP	05/27/88	2 89	2 90	-4
					RI/FS	S	08/07/84	4 88	3 89	-3
					RI/FS	S	08/07/84	4 88	2 89	-2
558.	9	CA	Teledyne Semiconductor	Mountain View	RI/FS	PS	09/01/82		3 91	new
559.	9	CA	T.H. Agriculture & Nutrition Co. (once listed as Thompson-Haywood Chemical Co.)	Fresno	RI/FS	PS	02/06/87	4 89	2 91	-6
560.	9	CA	Van Waters & Rogers, Inc.	San Jose	RI/FS	PS	12/01/82	2 89	2 91	-8
561.	9	CA	Waste Disposal, Inc.	Santa Fe Springs	RI/FS	FE	02/02/88		3 90	new
562.	9	CA	Watkins-Johnson Co. (Stewart Divison)	Scotts Valley	RI/FS	PRP	09/22/87	1 90	2 90	-1
563.	9	CA	Westinghouse Electric Corp. (Sunnyvale Plant)	Sunnyvale	RI/FS	SE	10/01/81	4 88	* *	*
					RI/FS	PRP	08/24/88		2 91	new
564.	10	ID	Arrcom (Drexler Enterprises)	Rathdrum	RI/FS	F	05/01/87	2 89	2 90	-4
565.	10	ID	Bunker Hill Mining & Metallurgical	Smelterville	RI/FS	S	01/02/85	1 89	1 92	-12
					RI/FS	PRP	05/13/87	4 88	2 93	-18
566.	10	ID	Union Pacific Railroad Co.	Pocatello	RI/FS	PRP	06/21/88		3 90	new

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	RG	ST	SITE NAME	LOCATION	ACTIVITY	LEAD	FUNDING START	PREVIOUSLY PUB. COMPLETION SCH.	PRESENT QTR. EST. COMPLETION	STATUS
567.	10	OR	Allied Plating, Inc.	Portland	RI/FS	F	09/24/87	4 89	4 91	-8
568.	10	OR	Teledyne Wah Chang	Albany	RI/FS	PRP	05/05/87		4 91	new
					RI/FS	PRP	05/05/87	1 90	4 89	1
569.	10	OR	United Chrome Products, Inc.	Corvallis	RA	F	09/21/87	4 88	3 89	-3
570.	10	WA	Commencement Bay, Near Shore/Tide Flats	Pierce County	RI/FS	S	07/07/82	3 88	4 89	-5
					RI/FS	PRP	09/10/86	3 89	4 89	-1
571.	10	WA	Commencement Bay, South Tacoma Channel	Tacoma	RI/FS	PRP	01/22/87	2 89	2 91	-8
572.	10	WA	FMC Corp. (Yakima Pit)	Yakima	RI/FS	PRP	07/31/87	1 89	3 90	-6
573.	10	WA	Harbor Island (Lead)	Seattle	RI/FS	F	09/07/88		1 92	new
574.	10	WA	Lakewood Site	Lakewood	RA	F	09/24/87	2 89	4 89	-2
575.	10	WA	Northside Landfill	Spokane	RI/FS	PRP	03/16/88		3 89	new
576.	10	WA	Northwest Transformer	Everson	RI/FS	F	09/28/85	3 88	2 89	-3
577.	10	WA	Queen City Farms	Maple Valley	RI/FS	PRP	05/06/88		4 91	new
578.	10	WA	Silver Mountain Mine	Loomis	RI/FS	F	09/21/87	4 89	4 89	0
579.	10	WA	Western Processing Co., Inc.	Kent	RA	PRP	07/06/87	1 89	4 89	-3
580.	10	WA	Wycoff Co./Eagle Harbor	Bainbridge Island	RI/FS	F	08/19/87	2 90	2 90	0

APPENDIX B

RECORD OF DECISION ABSTRACTS

This appendix provides detailed descriptions of FY88 feasibility studies (FSs), as required by CERCLA section 301(h)(1)(A). These descriptions are based on Records of Decisions (RODs) signed from October 1, 1987, through September 30, 1988. This appendix includes 149 ROD abstracts. Two of these ROD abstracts represent sites with more than one remedial action: the abstract for the Charles George Landfill in Massachusetts represents two remedial actions, and the abstract for the San Gabriel Valley site in California, which represents three remedial actions. Thus, EPA signed 152 RODs in FY88, which are summarized in this appendix by 149 abstracts.

The appendix summarizes both first and subsequent RODs; subsequent RODs are identified by an asterisk following the site name (e.g., Cannon Engineering*).

Each abstract provides background information on the Superfund site, including the date on which EPA signed the ROD, former use of the site, type of operation, contaminants of concern, and previous clean-up actions. Each abstract also includes a description of the remedial alternative selected in the ROD and provides information on the use of alternative or resource recovery treatment technologies and on the performance standards or goals for the site. All sites abstracted in the appendix are listed alphabetically according to the site name and are grouped by EPA Region.

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* subsequent ROD

+ represents more than one remedial action

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119. John Deere Dubuque Works	IA	7	B-126
120. Fulbright/Sac River LFs	MO	7	B-127
121. Hastings Ground Water/Colorado Avenue	NE	7	B-128
122. Hastings Ground Water/FAR-MAR-CO*	NE	7	B-129
123. Midwest Manufacturing/North Farm	IA	7	B-130
124. Minker/Stout/Romaine Creek*	MO	7	B-131
125. Shenandoah Stables	MO	7	B-132
126. Syntex Verona	MO	7	B-133
127. Times Beach*	MO	7	B-134
128. Anaconda Smelter/Mill Creek	MT	8	B-135
129. Broderick Wood Products	CO	8	B-136
130. California Gulch	CO	8	B-137
131. Central City/Clear Creek*	CO	8	B-138
132. Indian Bend Wash	AZ	9	B-139
133. Lorentz Barrel & Drum	CA	9	B-140
134. MGM Brakes	CA	9	B-141
135. Motorola 52nd Street	AZ	9	B-142
136. Operating Industries*	CA	9	B-143
137. Operating Industries*	CA	9	B-144
138. Ordot LF	Guam	9	B-145
139. San Gabriel Valley (Areas 1, 2, and 4)[+]	CA	9	B-146
140. Selma Pressure Treating	CA	9	B-147
141. South Bay Asbestos	CA	9	B-148
142. Tucson International Airport Area	AZ	9	B-149
143. Commencement Bay/Nearshore	WA	10	B-150
144. Commencement Bay/Tacoma*	WA	10	B-151
145. Frontier Hard Chrome*	WA	10	B-152
146. Frontier Hard Chrome	WA	10	B-153
147. Gould	OR	10	B-154
148. Martin Marietta	OR	10	B-155
149. Pacific Hide & Fur	ID	10	B-156

CANNON ENGINEERING, MA
First Remedial Action - Final
March 31, 1988

ROD ABSTRACT

The Cannon Engineering Corporation (CEC) facility is located in a small industrial park in the western part of the Town of Bridgewater, Plymouth County, Massachusetts. The four-acre site is bordered by industrial developments to the north and east and a wooded lowland to the south and west. A wetland area lies south and west of the site. CEC, which has owned the property since 1974, handled, stored, and incinerated chemical waste onsite from 1974 to 1980. EPA conducted site investigations between 1980 and 1982, and in October 1982, Massachusetts contracted for the removal of sludge and liquid waste from onsite tanks and drums. In January 1988, EPA provided for the removal and disposal of numerous hazardous materials abandoned at the site. This remedial action addresses three discrete areas of soil and sediment contamination located in the northwestern and southern portions of the site, and the buildings, tanks, and other contaminated structures onsite. The volume of contaminated soil is estimated to be 325 yd^3. The primary contaminants of concern affecting the ground water, soil, and debris are VOCs including benzene, TCE, and vinyl chloride, and other organics including PCBs and PAHs.

The selected remedial action for this site includes: access restrictions; excavation and onsite treatment of VOC-contaminated soil by thermal aeration, and excavation and offsite treatment of PCB-contaminated soil by incineration; decontamination, removal, and disposal of contaminated buildings, tanks, and structures; additional soil sampling to assess effectiveness; ground water monitoring and implementation of a water quality monitoring program to assess natural attenuation of contaminants; and institutional controls to restrict onsite ground water use. The estimated present worth cost for this remedial action is between $3,400,000, and $4,505,000 with present worth O&M of $700,000.

PERFORMANCE STANDARDS OR GOALS: Target cleanup goals for soil include benzene 55 ug/kg, and TCE 71 ug/kg (based on leaching potential into ground water as determined using the Organic Leaching Model), and PCBs 9 mg/kg (based on risk levels). Target goals for ground water include benzene 5 ug/l (MCL), TCE 5 ug/l (MCL), and vinyl chloride 2 ug/l.

INSTITUTIONAL CONTROLS: Deed and land restrictions will be implemented to prevent the use of onsite ground water.

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CHARLES GEORGE LANDFILL, MA
Third and Fourth Remedial Actions - Final
September 29, 1988

ROD ABSTRACT

The Charles George Landfill (CGL) site is located approximately one mile southwest of the Town of Tyngsborough, Massachusetts. The 70-acre site is bounded by Flint Pond Marsh (wetland area) and Flint Pond to the east, Dunstable Brook to the west, and the Cannongate Condominium complex to the southeast. Land use in the vicinity of the site is predominantly rural and residential but also includes some light industry and seasonal livestock grazing. The landfill contains municipal waste disposed of onsite from the mid-1950s until the landfill closed in 1983 by order of the Massachusetts Attorney General. Hazardous industrial waste was also disposed of primarily in the western area of the site from 1973 until at least 1976. The site came to the attention of the Massachusetts Department of Environmental Quality Engineering (DEQE) when the deep bedrock wells in use by the Cannongate Condominium complex became contaminated with VOCs. The DEQE ordered the wells closed in 1982. EPA conducted ground water monitoring in 1981 and 1982, and also undertook emergency removal actions beginning in August 1983 and continuing through March 1984. Presently the site has a thin soil cover, 2 surface water and leachate lagoons, 2 leachate collection systems, 1 recirculating pump station, and 12 shallow gas vents. Construction of a full synthetic landfill cap was addressed in a previous ROD and should begin in early 1989. This ROD encompasses the third and fourth operable units and focuses on the control and cleanup of contaminants that have spread or are spreading from the site, including the treatment of leachate collected as part of the cap system. Investigations have identified contaminated ground water in overburden, shallow bedrock, and deep bedrock zones. In addition, an estimated 500 yd^3 of sediments require remediation, and vent emissions from the landfill are contaminated with a wide array of VOCs. The primary contaminants of concern affecting the ground water, sediments and air, are VOCs including benzene and TCE, organics including PAHs, and metals including arsenic.

The selected remedial action for this site includes: extraction and treatment of shallow ground water plumes and leachate collected from the landfill cap system using biological treatment, metals precipitation and carbon adsorption with onsite discharge of the treated water into the aquifer or offsite discharge into nearby surface water; collection and incineration of landfill vent gas emissions; excavation and solidification of approximately 500 yd^3 of contaminated Dunstable Brook sediments and placement beneath the Phase II landfill cap; ground water monitoring and access restrictions. The estimated present worth cost for this remedial action is $11,320,000 which includes O&M costs of $601,000.

PERFORMANCE STANDARDS OR GOALS: The target cleanup levels for ground water are benzene and TCE 0.005 mg/l, cadmium 0.010 mg/l, and arsenic and silver 0.05 mg/l, all based on MCLs. Contaminants in the deep aquifer cannot practicably be extracted but will attenuate to health-based levels within a depth of 500 feet. The cleanup goal for sediments requires PAH levels of less than 1.0 mg/kg, based on a risk level of 4×10^{-6}. Target levels for 12 VOCs in vent emissions are listed based on a 1×10^{-6} cumulative risk level.

INSTITUTIONAL CONTROLS: Not applicable.

GROVELAND WELLS, MA
First Remedial Action
September 30, 1988

ROD ABSTRACT

The 850-acre Groveland Wells site is located in the Town of Groveland, Essex County, Massachusetts, within the lower Johnson Creek drainage basin. The site includes the watershed and aquifer which recharge two municipal supply wells, Station Nos. 1 and 2, and three known sources of soil, surface water, and ground water contamination: the Valley site, the A.W. Chesterson site, and the Havenhill Municipal Landfill site. This remedial action addresses source control at the Valley site. The remaining operable units of the Groveland Wells site will be addressed in subsequent remedial actions. The Valley site operable unit is located in the far northwestern section of the Town of Groveland, and is bordered to the north and south by residences within 100 feet of the site. The Town of Groveland's municipal water supply well, Station No. 1, is located approximately 3,500 feet northeast and downgradient of the Valley site, and is currently being treated to remove VOCs as part of an initial remedial measure by EPA. The Valley Manufactured Products Company (Valley) began operating a metals and plastic parts manufacturing business in 1963 on a 1.5-acre parcel of property owned by Groveland Resources Corporation (GRC).

The Valley site area consists of the land within and immediately adjacent to the GRC property boundaries and contains three subsurface disposal systems, an oil storage and recovery system consisting of six underground tanks and a 55-gallon drum storage area, both of which were used to store cutting oils and solvents such as TCE and methylene chloride. These subsurface disposal systems dispersed liquid effluent into the ground by filtration through a sand and gravel leach field. According to Valley/GRC, more than 20 gallons of waste cutting oil containing TCE and other hazardous substances were released each month on the ground at the south end of the building between 1964 and 1972. Also, at least four 55-gallon drums of the same material were used as a defoliant on the eastern side of the building. Between 1979 and 1984, effluent from an acid bath finishing process was discharged to an underground leach field, and TCE-contaminated oil was released on the soil under a loading dock and into a floor drain. In 1973, 500 gallons of raw TCE was released from an underground storage tank into the soil, and additional waste oils and solvents were dumped on the ground. A site investigation in 1983 revealed high levels of TCE, arsenic, lead, and copper in the underground disposal systems. Additional sample analysis has detected soil contaminated with VOCs from the surface to a depth of 15 feet in various locations onsite. Analysis of surface water and sediments from Mill Pond, downstream of the Valley site, as well as ground water from monitoring wells in the site area, also detected VOC contamination. Based on the concentration of VOCs detected in the subsurface soil and ground water and historical site use information, both media are believed to be contributing to ground water and surface water contamination in the Valley site area and the Mill Pond/Johnson Creek watershed and aquifer. The primary contaminants of concern affecting soil, sediments, ground water, and surface water are VOCs including TCE, PCE, toluene, and metals including arsenic and lead.

The selected remedial action for the Valley site operable unit includes: in situ vacuum extraction of approximately 20,000 yd^3 of unsaturated soil followed by activated carbon treatment of the extracted VOCs; onsite ground water pump and treatment by carbon adsorption and aeration, with recharge to the aquifer of a portion of the treated ground water upgradient of the site to accelerate removal of saturated zone soil contamination, and discharge of the remainder of the treated ground water to the aquifer downgradient of the site, and treatment of air emissions from the aeration process by carbon adsorption; ground water monitoring; and sealing or disconnecting all drains and lines to the acid bath finishing process disposal system. Incidental treatment of inorganic compounds and other contaminants will be provided as necessary in order to operate the VOC contaminant treatment system efficiently and to meet applicable discharge permit requirements. The estimated present worth cost of this remedial action is $4,165,000, with a 10-year present worth O&M cost of $2,677,000.

GROVELAND WELLS, MA
First Remedial Action
September 30, 1988
(continued)

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup levels for VOCs are based on MCLs or an excess cancer risk level of 10^{-6}. Individual goals include PCE 5.0 ug/l (MCL), TCE 5.0 ug/l (MCL) and toluene 2,000 ug/l. Inorganic contaminant cleanup levels are based on State of Massachusetts Ground Water Quality Standards and ground water discharge permit requirements. Individual goals include arsenic 50 ug/l and lead 50 ug/l. Individual soil cleanup goals for VOCs are based on achieving the target ground water levels and include TCE 6.3 ug/kg and PCE 18.2 ug/kg.

INSTITUTIONAL CONTROLS: Not applicable.

IRON HORSE PARK, MA
First Remedial Action
September 15, 1988

ROD ABSTRACT

The Iron Horse Park site is a 552-acre industrial complex and railyard located in North Billerica, Massachusetts. The site includes manufacturing and railyard maintenance facilities, open storage areas, landfills, and wastewater lagoons. A long history of activities at the site has resulted in contamination of soil, ground water, and surface water. In August 1984, EPA, under its removal authority, covered an onsite asbestos landfill located northwest and adjacent to the lagoons area. In September 1984, the site was placed on the NPL. In 1985, EPA began evaluations of the site and concluded that the size and complexity of the site, as well as the discreet nature of the contamination, necessitated dividing the site into several separate problem areas. This ROD addresses the cleanup of the Boston and Maine Wastewater Lagoons (B&M Lagoons) and surrounding area, which are operated by Boston & Maine (B&M) Corporation. The B&M Lagoons are a series of lagoons located within a 150-acre parcel of land leased from the Massachusetts Bay Transportation Authority, which uses most of the land to operate a passenger rail service. The lagoons have been receiving untreated industrial and sanitary wastewater from the manufacturing and railyard maintenance facilities since 1915. The lagoon area consists of the North and South lagoons, currently receiving wastewater, an overflow lagoon, one inactive lagoon used until 1954, and an empty lagoon that was never used. The lagoons contain approximately 7,800 yd^3 of soil and sludge contaminated primarily with VOCs, low levels of PAHs, and metals. In addition, approximately 20,000 yd^3 of soil and sludge dredged from the lagoon bottoms and disposed in piles along the lagoon banks are contaminated with low levels of organics and metals. The piles of dredged material and the sludge in the lagoons are not considered to contribute significantly to ground water contamination. This conclusion is based on the results of the TCLP test which indicates that these materials do not leach contaminants in significant concentrations. Additionally, the contaminants found in these materials are generally not found in the ground water. B&M has been ordered to stop discharging wastewater to the B&M Lagoons by the end of 1988 and plans to tie-in to the town of Billerica's sewer system. Subsequent RODs will address other portions of the site including a landfill and site-wide ground water. The primary contaminants of concern affecting the soil, sludge, and debris are VOCs, organics including PAHs, and metals including arsenic and lead.

The selected remedial action for this site includes: excavation and onsite biodegradation of contaminated soil and sludge with residual disposal to the lagoon area, followed by covering with a clean soil cover and revegetation; and decontamination of the lagoon system piping and pumps. The estimated capital cost for this remedial action is $2,273,000 with present worth O&M of $47,000.

PERFORMANCE STANDARDS OR GOALS: Treatment of soil and sludge will attain a less than 10^{-6} excess cancer risk for industrial use of the area, and a less than 10^{-5} excess cancer risk for residential use of the area. Treatment should reduce contaminant concentration in wastes by 70 to 80 percent, and will meet the state pathogen reduction requirements for sludge. Individual cleanup levels were not specified.

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to restrict land use.

KEEFE ENVIRONMENTAL SERVICES, NH
Second Remedial Action - Final
March 21, 1988

ROD ABSTRACT

The Keefe Environmental Services (KES) site is located in a semi-rural area in Epping, New Hampshire. Surface water from sections of this site flows toward a wetland area to the immediate south. Considerable filling and excavation have occurred at the site using the materials for site fill, road construction, surface leveling, and dike construction purposes. In May 1978, Mr. Paul Keefe constructed a chemical waste storage facility by establishing drum storage areas, large storage tanks, equipment shelters and a bulking area. A 700,000 gallon capacity, synthetically lined, waste lagoon was also installed. During April 1979, the New Hampshire Bureau of Solid Waste Management (NHBSWM) and the Division of Public Health Services (DPHS) ordered KES to clean up a number of leaking storage tanks, ruptured drums, improperly dumped latex waste and contaminated soils. At this time, a series of complaints were made by local residents concerning strong odors attributed to the site. These complaints resulted in legal action against KES. During September 1979, a surface water and ground water sampling program identified seven chlorinated hydrocarbons in the ground water wells. This resulted in the issuance of a second cleanup order focusing on the removal of all leaking drums, spills and contaminated soil, daily inspection of drums for leaks, and reduction in total number of drums stored onsite. Beginning in November 1979, drinking water wells of the twelve surrounding residences were sampled by the New Hampshire Water Supply and Pollution Control Commission (NHWSPCC) for chemical compounds and biological parameters. The sampling indicated the presence of several VOCs in some wells. Removal actions initiated between June 1981 and November 1982, and then again in March 1983, removed 2,029 fifty-five gallon drums, 84 thirty gallon drums, 47 cauldrons and trays, 51 carboys, 1,630 five gallon pails, 124 empty drums, and 10 fiber and 155 miscellaneous containers. In addition, approximately 4,100 five gallon drums, 4 five-thousand gallon, and 4 ten-thousand gallon above-ground tanks were removed from the site. A first operable unit ROD, signed in November 1983, approved the removal of contents from the lagoon, lagoon liner, and adjacent contaminated soil. This second operable unit addresses soil and ground water contaminated with VOCs.

The selected remedial action for this site includes: in-situ treatment of soil using vacuum extraction with discharge to the atmosphere and ground water pump and treatment using air stripping, filtration, and carbon adsorption with discharge to a ground water recharge area adjacent to the wetland along the site border. The estimated capital cost for this remedial action is $1,942,300 with present worth O&M of $4,157,700.

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup will meet a 10^{-5} cumulative excess risk. Individual ground water cleanup goals include: benzene 5 ug/l (MCL), trichloroethylene 5 ug/l (MCL), tetrachloroethylene 5 ug/l (based on TCE level), 1,2-dichloroethane 5 ug/l (MCL), and 1,1-dichloroethylene 7 ug/l (MCL). Cumulative soil cleanup goals will attain a 5.7×10^{-5} excess cancer risk level. Individual soil levels include: benzene 20.8 ug/kg, PCE 91.0 ug/kg, TCE 31.5 ug/kg, 1,2-dichloroethane 3.5 ug/kg, and 1,1-dichloroethylene 22.8 ug/kg.

INSTITUTIONAL CONTROLS: Not applicable.

LANDFILL & RESOURCE RECOVERY, RI
First Remedial Action - Final
September 29, 1988

ROD ABSTRACT

The Landfill & Resource Recovery (L&RR) site is located in North Smithfield, Rhode Island, and consists of a 28-acre landfill and a sand and gravel pit. Several unnamed streams lie to the south and east of the site and flow through wetlands located adjacent to the site area. Several homes near the site use ground water for drinking, and the Statesville reservoir, used for recreational activities, is located approximately 0.5 miles from the site. The L&RR site is a former sand and gravel pit that began accepting domestic, commercial, and industrial wastes in 1927. Site owners claim the hazardous materials were mixed in with municipal refuse and deposited in the north-central area of the site, but other reports indicate hazardous waste was spread over the entire site area. When hazardous waste disposal ceased in 1979, the owners placed a PVC cover over the north-central area to prevent stormwater infiltration. Commercial and domestic wastes were disposed of on top of and around the area in subsequent years. In 1983, the Rhode Island Department of Health installed monitoring wells onsite to ensure compliance with State regulations, and based on sampling results, ordered the site closed. Upon final closure in 1985, the owners covered 80 percent of the landfill area with one foot of sand, another synthetic cover and topsoil. Eighteen gas vents were installed to vent gases underlying the synthetic cover. The sand used as final cover has eroded into the adjacent wetlands, but sampling indicated no contamination was present. Low levels of VOCs and metals including lead, cadmium, and arsenic were discovered in downgradient ground water samples, but levels were sporatic and all were below MCLs. This remedial action will upgrade the existing landfill enclosure to protect ground water and wetlands, implement wetlands recovery operations, and collect and treat landfill gas to reduce risks to public health from inhalation. Primary contaminants of concern affecting the air are hydrogen sulfide and methane gases contaminated with VOCs including benzene, toluene, PCE, and TCE.

The selected remedial action for this site includes: access restrictions; stabilization of the steep side slopes of the landfill and installation of a RCRA cap over the entire landfill with revegetation; collection and thermal destruction of underlying gases, the method of thermal destruction to be determined in design; excavation of eroded landfill sand from the wetlands with replacement onsite and vegetation of excavated wetland areas; and ground water and air monitoring. The estimated present worth cost of the selected remedy is between $5,674,000 and $6,790,000, depending on the particular method of slope remediation and thermal destruction chosen. O&M costs were not provided.

PERFORMANCE STANDARDS OR GOALS: Thermal destruction of landfill gases will meet the Rhode Island Air Toxic Regulations at the site boundary.

INSTITUTIONAL CONTROLS: Not applicable.

LAUREL PARK, CT
First Remedial Action - Final
June 30, 1988

ROD ABSTRACT

The Laurel Park site is located in the Town of Naugatuck, New Haven County, Connecticut. The landfill, occupying about 19-acres of the 35-acre site, lies entirely within the drainage basin of the Naugatuck River. Additionally, the landfill is located on a hill in close proximity to fractured bedrock and bedrock aquifer. It is assumed that waste disposal actions began in the late 1940s. It was common practice to burn some of the waste brought to the site. Operational problems at the landfill were reported in the early 1960s. Complaints included chemical spills on roads leading to the landfill, large quantities of black acid smoke, odors, and blowing litter. In 1961, a lawsuit was filed and, in 1964, the owner was ordered to cease burning certain waste types. Between 1965 and 1966, the Connecticut State Department of Health investigated reports of contaminated surface water. Construction of a leachate collection system was completed in 1984. The operators of Laurel Park were ordered in January 1981 to stop landfilling in an unapproved excavation area. By April 1987, the landfill ceased receiving wastes. The primary contaminants of concern affecting ground water, soil, surface water, and sediments include: VOCs, organics, and metals.

The selected remedial action for this site includes: installation of a RCRA cap over all waste disposal areas; rehabilitation of existing leachate collection system, supplemented by a shallow ground water extraction system consisting of a French drain and/or ground water extraction wells, with discharge and offsite treatment at the Naugatuck Water Pollution Control Facility (NWPCF); and monitoring of all media. The estimated present worth cost for this remedial action is $21,706,300 without pretreatment, or $23,078,200 including pretreatment, if necessary.

PERFORMANCE STANDARDS OR GOALS: Ground water and leachate will be extracted to meet the RCRA Ground Water Protection Standard (GWPS) at the point of compliance, which is the vertical surface located at the hydraulically downgradient limit of the waste management area. Currently, the GWPS is set at the MCLs, ACLs, or background. Specific individual cleanup levels were not specified.

INSTITUTIONAL CONTROLS: Institutional controls have been recommended to prevent the bedrock aquifer in the site vicinity from being used as a source of water for any purpose.

OLD SPRINGFIELD LANDFILL, VT
First Remedial Action
September 22, 1988

ROD ABSTRACT

The Old Springfield Landfill site is located approximately one mile southwest of the city center in Springfield, Windsor County, Vermont. The land use within a one mile radius of the 27-acre site is primarily low density residential housing, light agriculture, undeveloped forest land and commercial development. The landfill was operated by the Town of Springfield between 1947 and 1968 for the disposal of municipal solid waste and hazardous industrial liquid and semi-liquid waste. The site is currently owned by Springfield Mobile Home Estates, which operates a trailer park currently consisting of 38 mobile homes. Approximately 60 people reside in the Springfield Mobile Estates trailer park, built on top of the landfill. The site first came to the attention of the Vermont Department of Health because of a complaint by a nearby resident of foul-smelling water. Investigation of the site found VOC contamination in a spring and in a residential well near the mobile home park. EPA began investigations at the site in 1976. Four areas of contamination have been identified at the site where industrial waste was either disposed of in discrete trenches or mixed with the municipal waste. This remedial action addresses landfill seepage and ground water contamination. The remedial action is designed for management of contaminant migration and study of final remediation alternatives. The primary contaminants of concern affecting the ground water, surface water, soil, and sediments are VOCs including benzene, PCE, TCE, toluene, and other organics including PCBs and PAHs.

The selected remedial action for this site includes: construction of an underground collection system to collect leachate; installation of wells for extraction of contaminated ground water; onsite treatment of the collected leachate and extracted ground water, or discharge to the Publicly Owned Treatment Works (POTW) for treatment; institutional controls to restrict the use of ground water that exceeds MCLs; multimedia monitoring; and additional studies to determine the feasibility of isolating waste materials from the ground water (e.g., french drain, slurry wall, or waste removal). The estimated present worth cost for this remedial action is $5,374,000 with annual O&M costs of $173,000.

PERFORMANCE STANDARDS OR GOALS: Cleanup goals for ground water and leachate will attain MCLs and include benzene 5 ug/1, 1,1-dichloroethene 7 ug/1, trichloroethene 5 ug/1, and vinyl chloride 2 ug/1.

INSTITUTIONAL CONTROLS: Institutional controls will be implemented and enforced to restrict the use of ground water where it may exceed MCLs.

ROSE DISPOSAL PIT, MA
First Remedial Action - Final
September 23, 1988

ROD ABSTRACT

The Rose Disposal Pit site occupies 1.5 acres in the northern section of a 14-acre residential lot located in Lanesborough, Massachusetts, approximately 4 miles north of Pittsfield. The property encompassing the site is bounded on the north, northeast, and west by forests, on the east and southeast by cropland and pasture, and on the southwest by a residential area. There is a small wetland west of the disposal area and a larger forested wetland to the southeast of the property. A small man-made pond is located approximately 200 feet south of the disposal area. During the 1950s and possibly later, the General Electric Company disposed of waste oils and solvents in a trench on the site, now referred to as the disposal area. Field investigations conducted between 1981 and 1986 revealed high concentrations of PCBs in surface and subsurface soils and indicated the presence of VOCs in ground water. The volume of contaminated soil to be remediated is approximately 15,000 yd^3. The primary contaminants of concern affecting the soil, sediments, ground water and surface water are VOCs including PCE, TCE, toluene, xylenes and other organics including PCBs.

The selected remedial action for this site includes: excavation and onsite incineration of approximately 15,000 yd^3 of contaminated soil and sediment with residue disposal onsite; ground water pump and treatment onsite using air stripping and carbon adsorption with discharge to the aquifer; installation of a bedrock well to prohibit ground water migration; treatment of pond sediments and surface water and subsequent restoration of the onsite pond to its original wetlands character; implementation of institutional controls; and ground water monitoring. The estimated present worth cost for this remedial action is $6,450,000 with estimated present worth O&M of $5,790,000.

PERFORMANCE STANDARDS OR GOALS: PCB-contaminated soil above 13 mg/kg (based on 10^{-5} risk level) will be excavated and treated to a PCB concentration of less than 2 mg/kg. Treated ground water will achieve MCLs, if available, or MCLGs, Lifetime Health Advisory (LHA) or a 10^{-6} cancer risk level. Individual ground water cleanup goals include PCE 1 ug/l (10^{-6} risk level), benzene (MCL), and TCE (MCL).

INSTITUTIONAL CONTROLS: Institutional controls will be implemented to prevent ground water use and excavation within the disposal area.

YAWORSKI LAGOON, CT
First Remedial Action - Final
September 29, 1988

ROD ABSTRACT

The Yaworski Lagoon site is a dewatered and backfilled lagoon, approximately 700 feet long and 300 feet wide and surrounded by an earthen dike. It is located on an approximately 100-acre section of land in Canterbury Township, Windham County, Connecticut, on the floodplain of and bordered on the north, south and west by the Quinebaug River. The area surrounding the site includes agricultural land to the east and south. Leachate enters the ground water from below the lagoon; seepage from the lagoon dikes and surface runoff from the site flow to adjacent wetlands. Approximately 2000 feet southeast of the site is an operating solid waste landfill owned by James Yaworski, the same person who operated the lagoon. The landfill contributes some contamination to ground water, but EPA monitored the site in 1988 and determined the contamination to be much less than from the lagoon. Between 1950 and 1973, sludge materials and drums of industrial waste including solvents, paint, textile dyes, acids, resins, and other debris, about 50,000 barrels of waste material altogether, were deposited in the lagoon. The lagoon currently contains approximately 65,000 cubic yards of contaminated sludge covered by about 60,000 cubic yards of contaminated debris. The sludge is a mixture of water, dirt, VOCs, and other organic compounds at concentrations above 10,000 ppm. Metals are at concentrations above 1000 ppm. Monitoring wells were installed at the site in 1976 and ground water contamination was detected. In 1982, following an investigation of the site, CT DEP ordered Yaworski to close the lagoon. The primary contaminants of concern affecting the ground water, soil and sediments are VOCs including benzene, toluene and xylenes, organics including PAHs and metals including chromium and lead.

The selected remedial action for this site includes: installation of a RCRA cap; improvement of dike around the lagoon to ensure protection from floods; establishment of a ground water protection standard (ACL); and monitoring of ground water for 30 years. A ground water treatment method will be established as part of a corrective action program if, after implementation of the source control remedy, ground water contamination remains above ACLs. The estimated capital cost of this remedial action is $1,673,000 with present worth O&M of $716,600.

PERFORMANCE STANDARDS OR GOALS: Ground water ACLs will be established as part of the selected remedy. Individual ACLs were not specified.

INSTITUTIONAL CONTROLS: Restrictions will be implemented to restrict ground water use onsite and within 1500 feet offsite.

AMERICAN THERMOSTAT, NY
First Remedial Action
January 7, 1988

ROD ABSTRACT

The American Thermostat Corporation (ATC) site, occupying approximately eight acres, is located in South Cairo, New York. Private homes are near the site on its eastern and western boundaries. Former plant operations involving the assembly of thermostats for small appliances were carried out in one existing large building. From the mid 1950s through at least 1981, waste containing TCE and PCE sludges were poured down drains which were connected to an abandoned septic system and dumped outside onto plant grounds. The drains were connected to the abandoned septic system. In March 1981, two ATC employees were observed dumping solvents on plant property. This triggered investigations into the company's waste handling practices by the New York State Department of Environmental Conservation (NYSDEC) and the New York State Attorney General's office. Subsequently, water samples collected in five privately-owned wells in the ATC vicinity revealed the presence of high levels of TCE and PCE. As a result, ATC began supplying bottled water to local residents in April 1981. By late 1982, ATC had installed carbon filters on its own well and the affected residential wells. Pursuant to a 1983 Consent Order, ATC and AMRO Realty Corporation (AMRO), the owners of the property, agreed to clean up the site and its surroundings; supply bottled water for cooking and drinking purposes; and install, monitor, and maintain carbon filter systems for the five affected homes. ATC and AMRO did not fully comply with the Consent Order and did not remedy the contamination at the site. In June 1983, a new onsite 4,500-gallon septic system was installed and, in September 1983, ATC provided carbon filtration for septic system discharges to lower PCE levels. ATC ceased operations in May 1985 and filed involuntary bankruptcy. EPA has been sampling area wells and maintaining previously installed carbon filtration units. In addition, EPA installed two new carbon filtration units on contaminated private wells; installed two air stripping system on a highly contaminated well; and drilled a new well attempting to locate a clean water supply. The primary contaminants of concern affecting the ground water are VOCs including PCE and TCE.

The selected remedial action for this site includes: provision of an alternate water supply through extension of the existing Catskill Water District pipeline from Sandy Plains Road or from Rudolph Weir Road to the affected and potentially affected area. The exact route of the pipeline will be determined during design. The estimated capital cost for this remedial action ranges from $2,270,000 to $2,380,000 with annual O&M of $100,000 to $110,000, pending the pipeline route decision.

PERFORMANCE STANDARDS OR GOALS: This first operable unit will meet the MCLs for TCE 0.005 mg/l, 1,1-dichloroethylene 0.007 ug/l, and 1,1,1-trichloroethane 0.200 mg/l, and the Water Quality Criteria chronic level for PCE of 0.800 mg/l.

INSTITUTIONAL CONTROLS: Not applicable.

ASBESTOS DUMP, NJ
First Remedial Action
September 30, 1988

ROD ABSTRACT

The Asbestos Dump site is an 11-acre commercial property, formerly an asbestos processing plant, in Millington, New Jersey. It is bounded by the Passaic River, the Millington Train Station, commercial properties, and private residences. Part of the site lies within the flood plain of the Passaic River which serves as a public water supply source for 74,000 people. Approximately 200 individuals are employed by 21 businesses operating on the active portion of the site. Asbestos, Limited, engaged in the fiberization and sale of asbestos at the site from 1927 until 1946. From 1946 until 1953, the plant was owned by Bernard E. Smith and operated under the name of Smith Asbestos, Inc., a manufacturer of asbestos roofing and siding. During these years waste water from the manufacturing process was impounded on the site to permit settling of asbestos fibers suspended in the water. Periodically, the sediment was removed, disposed of onsite and covered with dirt. In May 1953, the property was acquired by National Gypsum, which manufactured cement asbestos siding and roofing sheets at the plant until 1975. Most of the waste was recaptured and recycled during this period, although broken siding and asbestos fibers were dumped on a five-acre area on the property. From 1959 until 1972, National Gypsum used phenylmercuric acetate (PMA) as a fungicide to coat the asbestos shingles. Waste generated by the cleaning of coating equipment was disposed of in small pits onsite. In May 1975, National Gypsum closed the Millington plant. The total asbestos waste at the site is estimated to be 90,000 cubic yards. The primary contaminant of concern affecting ground water and soil is asbestos.

The selected remedial action for this site includes: installation of a two-foot soil cover on areas of exposed or minimally covered asbestos, construction of slope protection/stabilization measures along the asbestos mound embankment, and surface run-off diversion channels on top of asbestos mound; long-term monitoring including offsite ground water monitoring; access restrictions; institutional controls to restrict onsite ground water use and limit development on the asbestos fill area; and performance of treatability studies to evaluate technologies that may permanently remediate asbestos. The estimated present worth cost for this remedial action is $1,145,000 with annual O&M of $56,000 to $161,000.

PERFORMANCE STANDARDS OR GOALS: The selected remedy, covering the asbestos contaminated areas with two feet of soil, will comply with the National Emissions Standards for Hazardous Air Pollutants (NESHAPs) requirements of the Clean Air Act.

INSTITUTIONAL CONTROLS: Institutional controls will be implemented to prevent onsite ground water use and development on the asbestos fill areas.

BEACHWOOD/BERKELEY WELL, NJ
First Remedial Action - Final
June 30, 1988

ROD ABSTRACT

The Beachwood/Berkeley Well site, encompasses Beachwood Borough and Berkeley Township in central-east Ocean City, NJ. The total population of the two municipalities is approximately 23,000. In response to a public complaint of possible aluminum contamination of drinking water, the New Jersey Department of Environmental Protection (NJDEP) sampled four potable wells and discovered the presence of lead in excess of the Federal Interim Primary Drinking Water Standard. Subsequent sampling confirmed the presence of lead at approximately four times the standard. The Ocean County Health Department collected additional samples in the two municipalities. Results of analyses indicated that 15 percent of the total wells sampled in the Borough and three percent of the residential wells sampled in the Township exceeded the regulatory standard for lead in drinking water; however, there was no distinct geographical pattern to the occurrence of the lead contamination. By order of the NJDEP, an alternate supply of water was provided to the affected residents. After extensive investigation of lead levels in residential tap water, surface water, ground water, sediments and soils and lead concentrations in and dissolution from plumbing systems, it was concluded that elevated concentrations of lead in drinking water were not caused by man-made or industrial sources. Rather, the sources of lead include a minor contribution from native area ground water, lead packers used in well construction and dissolution of lead from lead-bearing materials of home plumbing systems, particularly lead/tin solder.

Remediation under the Superfund program of the documented existence of lead in drinking water resulting from dissolution from residential plumbing systems is precluded by law. The State of New Jersey is proceeding independently of Federal Superfund financing to address the problems posed by the presence of lead in drinking water.

PERFORMANCE STANDARDS OR GOALS: Remediation involves the interim remedy waiver for contaminant-specific ARARs; however, ground water extraction and discharge will meet MCLs. Individual MCL goals were not specified.

INSTITUTIONAL CONTROLS: Not applicable.

BREWSTER WELL FIELD, NY
Second Remedial Action - Final
September 29, 1988

ROD ABSTRACT

The Brewster Well Field consists of two municipal well fields, No. 1 and No. 2, located on the northern bank of the East Branch Croton River, 3/4 of a mile east of the Village of Brewster, Town of Southeast in Putnam, New York. The 18 shallow wells in the field are a source of water for the municipal water system that serves over 2100 residents in the Village of Brewster and the Town of Southeast, as well as a number of businesses and a railyard. Additional receptors of the ground water from this aquifer include downstream users of the East Branch Croton River, which contributes to the Croton Falls Reservoir approximately 3.5 miles downstream. Also, two reservoirs exist upstream to the east and northeast within 3000 feet of the site, which are part of New York City's Croton watershed reservoir system. Land use to the north and west is predominantly residential, and to the south commercial and light industrial. VOC contamination was detected in the Brewster Well Field in 1978 and alternate water sources were subsequently added. Investigations identified the source of contamination as a drywell adjacent to the Alben Cleaners south of the site, where dry cleaning wastes were disposed of via a floor drain until 1983. Approximately 100 yd^3 of material including drywell sludges, sediments and soil have been contaminated with VOCs at concentrations up to 620,000 ppm. In addition, a plume of ground water contaminated with VOCs at concentrations up to 6,000 ppb extends from the vicinity of the cleaners north to the Brewster Well Field. Consequently, the Village of Brewster and EPA have operated a full scale packed column spray aeration system for treatment of the entire village supply since 1984. The first Record of Decision (ROD) for the site was signed in September 1986, and was aimed at controlling migration of contamination through the ground water. The ROD called for the design and construction of a ground water management system to extract, treat (by air stripping via a packed tower) and reinject ground water to expedite the removal of VOCs. This second ROD is designed to remediate the source of contamination, namely the drywell. The primary contaminants of concern affecting the soil, sediments, sludge and ground water are VOCs including PCE and TCE.

The selected remedial action for this site includes: excavation and offsite incineration of approximately 100 yd^3 of drywell sediments, sludge, and soil with greater than four ppm PCE followed by offsite disposal; and removal, decontamination and offsite disposal of the concrete drywell structure and debris. The estimated capital cost for this remedial action is $241,940.

PERFORMANCE STANDARDS OR GOALS: Remediation of all soil, sediments, sludge and debris greater than four ppm PCE will reduce health risks due to direct contact with contaminated site soils to 1×10^{-6}.

INSTITUTIONAL CONTROLS: Not applicable.

BURNT FLY BOG, NJ
Second Remedial Action
September 29, 1988

ROD ABSTRACT

The Burnt Fly Bog site is located in Marlboro Township, Monmouth County, New Jersey. The site is situated in a rural area with an auto salvage yard and a few scattered residences nearby. The entire Burnt Fly Bog encompasses about 1,700 acres. This remedial action addresses the 10-acre area constituting the Westerly Wetlands Operable Unit. The area is affected by contamination from the 10-acre parcel where waste was originally deposited (Uplands Area Operable Unit). The site includes both flood plains and wetlands. Contamination has been detected in the surface water, surface soil, and the shallow subsurface soil as a result of uncontrolled discharges and runoff from the Uplands Area waste sources. The Uplands Area includes several abandoned oil storage and treatment lagoons containing residual oil sludges and aqueous wastes, contaminated waste piles and buried or exposed drummed wastes. These are the result of activities at the site from 1950 to 1965. The site property is presently owned by Mr. Dominick Manzo, who operated part of the property as a sanitary landfill from 1963 to 1969. The Uplands Area is currently being cleaned up under a Record of Decision signed on November 16, 1983. The volume of soil contaminated with PCBs and lead is estimated to be 76,400 yd^3 at the site, with an additional 5,600 yd^3 of contaminated sediments in an adjacent downstream area. There is no evidence of PCB contamination in surface water. The primary contaminants of concern affecting the surface water, soil and sediments are PCBs and lead.

The selected remedial action for this site includes: access restrictions; excavation of contaminated sediments from the downstream area with disposal at an offsite RCRA Subtitle C facility; as an interim remedy, containment without capping contaminated soil in the Westerly Wetlands through installation of a sedimentation basin and appropriate diversion controls; and performance of treatability studies on the most promising innovative technology alternatives to provide the final remedy. A subsequent ROD will address this final remedy for the contaminated soil. The estimated present worth cost for this remedial action using a 20-year life estimate is $6,100,000 with annual O&M costs of $320,000.

PERFORMANCE STANDARDS OR GOALS: The excavation of the downstream area sediments meet the State soil cleanup criteria for PCBs 5 mg/kg and lead 250 mg/kg.

INSTITUTIONAL CONTROLS: Not applicable.

EWAN PROPERTY, NJ
First Remedial Action
September 29, 1988

ROD ABSTRACT

The 43-acre Ewan Property site is located in a predominantly agricultural and residential area of Shamong Township, Burlington County, New Jersey. Private residences are provided domestic water from wells as close as one mile downgradient from the site, drawing from an aquifer that extends from beneath the site. The site is broken into two study areas, Area A and Area B. Area A, consisting of nine acres, is the area of concern. Site investigations revealed that during the early to mid-1970s, at least 500 to 8,000 55-gallon drums containing hazardous industrial wastes were disposed of in trenches in Area A, and the trenches were subsequently backfilled with soil. Investigations also revealed that many of the drums are ruptured, corroded or leaking. Soil and ground water samples indicate the presence of VOCs and metals. It is estimated that Area A has 4,500 yd^3 of highly contaminated soil and waste material, and 29,500 yd^3 of moderately contaminated soil. Primary contaminants of concern affecting soil and ground water are VOCs such as benzene, TCE, PCE and xylenes, and metals including chromium and lead.

The selected remedial action for this site includes: construction of decontamination, staging and waste characterization areas; excavation, staging and characterization of waste materials with offsite incineration of all appropriate wastes (approximately 4,500 yd^3 of buried drums and heavily contaminated soil); temporary onsite storage and assessment of non-incinerable wastes to determine proper disposal method; and monitoring of air and ground water during remedial activities. The estimated present worth cost of the selected remedy is $21,153,000 with estimated annual O&M costs of $22,000.

PERFORMANCE STANDARDS OR GOALS: Will be determined during the remediation of a subsequent operable unit.

INSTITUTIONAL CONTROLS: Not applicable.

GE WIRING DEVICES, PR
First Remedial Action - Final
September 30, 1988

ROD ABSTRACT

The GE Wiring Devices site is located in Juana Diaz, Puerto Rico. The General Electric Company (G.E.) owns and operates a five-acre wiring devices plant at this site, which assembled silent mercury switches from 1957 until 1969. Approximately half a ton of mercury was discarded along with 4,000 yd^3 of defective switch parts and plastic scraps in an onsite waste-fill area about one acre in area and one to four feet deep. Several residences are located approximately 400 feet south of the waste-fill area, which is surrounded by a concrete retaining wall and a fence. Ground water in the area is used as a source of drinking water with a public supply well located approximately 1,500 feet west of the waste-fill area. In addition, ground water flows to the west toward the San Jacaquas River. About 500,000 gallons of perched water has accumulated within the waste-fill area as a result of precipitation/recharge. Evidence indicates that contamination of the water table is occurring due to the migration of perch water through the clay layer that exists beneath the waste-fill area. Approximately 1,500 yd^3 of near-surface soil south and downgradient of the waste-fill area has been contaminated by mercury primarily as a result of previous surface runoff from the plant area. The primary contaminant of concern affecting the ground water, soil, and debris is mercury.

The selected remedial action for this site includes: onsite hydrometallurgical treatment of the waste-fill materials, perched water and contaminated near-surface soil with disposal of the treatment residue in the former waste-fill area, followed by covering with a clean soil cover, and onsite treatment of the process leaching agent with discharge to a POTW; additional investigation of the ground water to determine the extent of contamination; and limited ground water monitoring, provided there is no need for ground water remediation. The estimated capital cost for this remedial action is $1,912,870. There are no O&M costs associated with this remedy.

PERFORMANCE STANDARDS OR GOALS: Soil, perched water, and debris will be treated to a health-based cleanup level of 16 ppm if further air sampling verifies levels exceeding the EPA National Emission Standard for a Hazardous Pollutant (NESHAP), or 21 ppb, based on risk due to ingestion, if there are no levels exceeding NESHAP.

INSTITUTIONAL CONTROLS: Not applicable.

KIN-BUC LANDFILL, NJ
First Remedial Action
September 30, 1988

ROD ABSTRACT

The 220-acre Kin-Buc Landfill consists of a number of inactive industrial and municipal waste disposal areas and is located in the Raritan River 100-year flood plain and within a coastal zone in Edison Township, Middlesex County, New Jersey. Bordering the site is an industrial park directly north, the Edison Township Municipal Landfill 600 feet to the south, marshlands to the east, and the Raritan River bordering the west. Land use within one mile of the site includes residential, light industrial, and recreational areas. Landfill operations were conducted between 1947 and 1977. Details on the owners/operators of the site are unknown prior to 1968, when Kin-Buc, Inc., leased the area from Inmar Associates. According to site records, an estimated 70 million gallons of liquid wastes, including three million gallons of oily waste and over one million tons of solid waste, were disposed of between 1973 and 1976 alone. Examples of wastes received include solvents, waste oils, paint sludges, cyanides, metal stripping wastes and paint thinners. The Kin-Buc site includes three major mounds: Kin-Buc I (30 acres), Kin-Buc II (12 acres), which lies directly north of Kin-Buc I, and Mound B (9 acres) which lies southwest of Kin-Buc I adjacent to the Raritan River. Additionally, three pits of black oily leachate, Pits A, B, and C, are located at the southeastern edge of Kin-Buc I; there is a refuse-filled low-lying area between Kin-Buc I and the Edison Landfill; and an area of impounded, tidally affected water, Pool C, contaminated by Kin-Buc I is adjacent to the pits. Site activities included burying and compacting contained wastes in Kin-Buc II, and discharging hazardous liquid wastes into bulldozed pits at the top of Kin-Buc I. These practices resulted in numerous citizen complaints, caused frequent major onsite fires and a number of serious occupational injuries. EPA began investigations in January 1976 and detected the discharge of hazardous substances from the facility. In February 1980, EPA began cleanup activities consisting of collection, treatment and disposal of Pool C leachate; a drum reduction program; oily-phase leachate collection and onsite storage; and aqueous-phase leachate pretreatment, removal and offsite treatment. In September 1980, Kin-Buc, Inc. was ordered to cap Kin-Buc I and II. This source control ROD addresses remediation of the first of two operable units, which includes Kin-Buc I and II, Pool C, and the low-lying area between Kin-Buc I and Edison Landfill. A subsequent ROD will address offsite migration controls. The primary contaminants of concern affecting the ground water, surface water, sediments, soil and air are: VOCs including benzene and toluene, other organics including PAHs and PCBs, and metals including arsenic and lead.

The selected remedial action for this site includes: installation of a slurry wall surrounding the site; RCRA capping over Kin-Buc II, a portion of the low-lying area between Kin-Buc I and the Edison Landfill, and Pool C; maintenance and upgrading, if necessary, of the Kin-Buc I cap; collection of approximately three million gallons of oily-phase leachate with offsite incineration and residual disposal; collection and onsite biological or carbon treatment of aqueous-phase leachate and contaminated ground water with discharge either to surface water or POTW, and dewatering of residual sludges and offsite disposal; ground water monitoring; and O&M. The estimated present worth cost for this remedial action is between $16,290,000 and $16,635,000 with annual O&M varying from $848,000 (year 1) to $405,000 (years 12-20).

PERFORMANCE STANDARDS OR GOALS: Incineration of oily-phase leachate will meet six nines (99.9999%) destruction and removal efficiency. Aqueous-phase leachate and contaminated ground water discharge criteria will be established by NJDEP based on the results of treatability studies, but will meet NJAC water quality criteria and wastewater discharge requirements. Individual cleanup goals were not specified.

INSTITUTIONAL CONTROLS: Institutional controls will be implemented to restrict use of the property as necessary to prevent damage to the cover.

LIPARI LANDFILL, NJ
Third Remedial Action - Final
July 11, 1988

ROD ABSTRACT

The Lipari Landfill site is a municipal and industrial waste landfill in Mantua Township, Gloucester County, New Jersey. The landfill consists of an "onsite" and an "offsite" portion. The onsite portion is a formerly active landfilling area that consists of a slurry wall/synthetic membrane containment system. This portion was addressed in a previous remedial action. A separate previous remedial action focused on flushing water-transportable contaminants from within the containment system. This remedial action addresses the offsite portion of the site which is the area outside of the encapsulation system consisting of agricultural and residential areas that include several lakes, streams and parks. The site is bordered by the Zee Orchard on the north and west, and a housing development on the northeast. The site property was purchased by Mr. Nicholas Lipari in 1958 and was used until 1971 for excavation of sand and gravel and landfilling of municipal and household wastes, liquid and semi-solid chemical wastes and other industrial wastes. Offsite investigations indicate that lakes, streams and marshland in the area surrounding the site have been impacted by contaminant migration from the landfill. The primary contaminants of concern affecting the ground water, surface water, sediments, soil and air are VOCs including benzene, toluene and xylene, and metals including arsenic, chromium and lead.

The selected remedial action for the offsite areas includes: collection of the contaminated ground water/leachate, followed by onsite treatment and discharge to POTW; excavation of contaminated marsh soil, and dredging and dewatering contaminated sediments, followed by thermal treatment and offsite disposal as nonhazardous material; integration of offsite sampling with the onsite monitoring plan being developed to monitor the effectiveness of the onsite flushing action; and temporary remedial measures in the surrounding marshland, if necessary, to mitigate volatile emissions from leachate seepage areas. The estimated present worth cost for this remedial action is $21,000,000. O&M costs were not provided.

PERFORMANCE STANDARDS OR GOALS: Soil cleanup will attain the New Jersey soil cleanup objectives developed under the Environmental Cleanup and Responsibility Act (ECRA) and health or risk-based criteria. Surface water cleanup will meet Federal and State Water Quality Criteria and surface water standards. Individual contaminant goals were not provided.

INSTITUTIONAL CONTROLS: Not applicable.

LOVE CANAL, NY
Second Remedial Action
October 26, 1987

ROD ABSTRACT

The Love Canal site is located in the southeast corner of the city of Niagara Falls, New York, and is approximately one-quarter mile north of the Niagara River. The canal was one of two initial excavations designed to provide inexpensive hydroelectric power for industrial development around the turn of the 20th century. Hooker Chemicals and Plastics Corporation (Hooker), now Occidental Chemical Corporation, disposed of over 21,000 tons of chemical wastes, including dioxin tainted trichlorophenols, into Love Canal between 1942 and 1953. In the mid to late 1970s, continued periods of high precipitation contributed to water accumulation in the disposal area causing chemically-contaminated leachate to be carried to the surface and into contact with residential basement foundations. Also, dioxin and other contaminants migrated from Love Canal to the sewers which have outfalls to nearby creeks. The remedial program at Love Canal has been extensive and has occurred in two phases. Phase one consisted of measures aimed at site containment. Phase two has been directed at remediating contaminated drainage tracts, including nearby creek and sewer sediments which are contaminated with 2,3,7,8-tetrachlorodibenzo-p-dioxin, commonly referred to as dioxin. The 1985 remedial action called for the removal of contaminated sediments from the creeks and sewers, followed by interim storage in an on-site containment facility. This remedial action requires the removal of approximately 15,000 yd^3 and 1,000 yd^3 of creek and sewer sediments respectively, as well as associated contaminated debris from remediation.

The selected remedial action for this site includes: construction of an onsite creek sediments dewatering/containment facility (DCF) to include a separate construction/demolition debris facility (CDF); onsite thermal destruction of the stored creek and sewer sediments and associated remedial waste stored in the DCF; thermal destruction of leachate treatment residuals and other dioxin contaminated material derived from site remediations; onsite storage of uncontaminated debris in the CDF; onsite disposal of non-hazardous thermal treatment residuals in a manner that avoids disturbance of the existing cap; and scaling down of the DCF to only include the construction/demolition debris material. An estimated 25,000-35,000 yd^3 of dioxin contaminated material will require thermal destruction. The estimated present worth cost for this remedial action ranges from $26,400,000 to $31,400,000.

PERFORMANCE STANDARDS OR GOALS: The Centers for Disease Control have generally applied a 1 ug/kg level of concern for dioxin in residential soils for other areas in the country. A technical review determined that separation and consolidation of the dioxin-contaminated sediments above 1 ug/kg is not implementable and would lead to unacceptable project delays. In addition, the community is opposed to any remedial alternative that does not call for thermal destruction of all the contaminated creek and sewer sediments. As a result, all materials (excluding 5,500 yd^3 of house debris) will be thermally treated. Six nines (99.9999%) destruction and removal efficiency will be the performance standard. In addition, excavation to approximately 18 inches will ensure the elimination or reduction of risk. (Creek sediment contamination was detected only to a depth of 12 inches).

INSTITUTIONAL CONTROLS: Not applicable.

LOVE CANAL/93rd STREET SCHOOL, NY
Third Remedial Action
September 26, 1988

ROD ABSTRACT

The Love Canal/93rd Street School site consists of approximately 19 acres and includes a school and an adjacent vacant lot. The site is located in Niagara Falls, New York, less than one mile northwest of Love Canal and is within the Love Canal Emergency Declaration Area. It is bordered by Bergholtz Creek to the north and residential properties to the east, west and south. A small area east of the school and adjacent to Bergholtz Creek is within a 100-year flood plain. Hooker Chemicals and Plastics Corporation disposed of over 21,000 tons of various chemicals at the Love Canal site from 1942 to 1953, when the site was deeded over to the City of Niagara Falls Board of Education. Sampling has revealed that approximately 6,000 yd^3 of soil are contaminated. During the 1950s, home construction accelerated in the area. Specifically, in 1950, the 93rd Street School was built, and in 1954, the 99th Street School was built adjacent to the middle portion of the Canal. Prior to construction of the 93rd Street School, a drainage swale crossed the site. Between 1938 and 1951, the swale was partially filled with soil and rock debris, followed by sand and fly ash materials. In 1954, the site was graded to its present contours with approximately 3,000 yd^3 of fill material, including fill from the 99th Street School. The fill material is reported to contain fly ash and BHC (pesticide) waste. In 1980, the 93rd Street school was closed due to public health concerns related to the potentially contaminated fill material. The primary contaminants of concern affecting soil are VOCs, including toluene and xylenes, other organics including dioxins, PAHs and pesticides, and metals including arsenic and lead.

The selected remedial action for this site includes: excavation and solidification/stabilization of 7,500 yd^3 of soil; placement of solidified soil back in excavated location; installation of a RCRA cap; ground water monitoring; and implementation of treatability studies for solidification process. The estimated capital cost for this remedial action is $2,295,000 to $3,675,000 with estimated annual O&M of $121,000.

PERFORMANCE STANDARDS OR GOALS: This remedy will permanently immobilize soil which poses an unacceptable carcinogenic risk. Specifically, all excavated soil will be treated to meet the Land Disposal Restrictions requirements for dioxin of less than 1 ug/l, as measured in the soil leachate by the TCLP test.

INSTITUTIONAL CONTROLS: Not applicable.

LUDLOW SAND AND GRAVEL, NY
First Remedial Action
September 30, 1988

ROD ABSTRACT

The Ludlow Sand and Gravel site is located approximately six miles south of Utica, in the town of Paris, Oneida County, New York. The site consists of a gravel pit and landfill on a 130-acre tract of land, owned and operated by Mr. James Ludlow. It is surrounded by rural residential and agricultural land and includes a New York State designated wetland south and east of the fill area. The landfill, which is the focus of this ROD, is in a ground water recharge zone to the principal aquifer along Sauquoit Creek. Fill material is in contact with the ground water in some locations in the landfill. Sauquoit Creek serves as a major discharge point for ground water flowing from this aquifer. Various organizations and individuals have disposed of waste at the site since 1966. This waste included domestic wastes, septic tank effluent, industrial wastes such as dyes, waste oils and metallurgical cooling oils, and animal parts from a meat processing plant. In late 1982, sampling revealed traces of PCB contamination in the leachate pools on the southern portion of the property. In July 1987, the District Court of Binghamton ordered Mr. Ludlow to cease operations at the site. Mr. Ludlow complied with the court order and closed the landfill by February 15, 1988. The primary contaminants of concern affecting soil, sediments and ground water are VOCs including benzene and toluene and organics including PCBs and phenols.

The selected remedial action for this site includes: consolidation and onsite disposal into the landfill of approximately 10,000 yd^3 of contaminated soil and sediment adjacent to the landfill and installation of an impermeable cover over the landfill; collection of leachate from seepage areas formed from the landfill and dewatering of the landfill through use of a passive drain system or an active well system with onsite treatment of the collected leachate/ground water and offsite discharge of the effluent, or, if dewatering is not implemented, collection and transportation of leachate offsite to a permitted disposal facility; implementation of upgradient ground water controls to lower and prevent the ground water table from coming in contact with the waste material; access restrictions; imposition of deed restrictions governing future use of the property; and implementation of a long-term water quality monitoring program including both onsite and offsite ground water, surface water and potable water supply wells. A second remedial action will address ground water remediation, if necessary. This remedial action is a combination of three alternative remedies. The present worth cost is estimated to be between $3,727,200 and $14,548,900 with an annual O&M between $58,900 and $364,900.

PERFORMANCE STANDARDS OR GOALS: Treated effluent for discharge will meet substantive requirements of the New York State Pollution Discharge Elimination System (6 NYCRR Parts 750-757 and 701.5), Technical Operations Guidance Series (700 1.1.1), Ambient Water Quality Standards and Guidance Values (April 1987), all ground water and surface water standards, and Freshwater Wetlands Standards (6 NY CRR Part 663-665). PCBs will be cleaned up to a level of 10 ppm, as recommended by the TSCA PCB Spill Cleanup Policy Final Rule (40 CFR Part 761).

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to control future use of the property.

MARATHON BATTERY, NY
Second Remedial Action
September 30, 1988

ROD ABSTRACT

The Marathon Battery Company (MBC) site, a former battery manufacturing plant, is located in the Village of Cold Spring in Putnam, New York, approximately 40 miles north of New York City. The area surrounding the site includes the Hudson River to the west, residential areas to the northwest, west, and southwest adjacent to the site, and wetlands including Foundry Cove, which is divided into East Foundry Cove (EFC) and West Foundry Cove, to the south. The site operated from 1952 to 1979 producing military and commercial batteries. During this time the site changed ownership several times, finally operating as the MBC from 1969 to 1979. Before 1965, the plant's wastewater treatment system discharged into the Hudson River at the Cold Spring pier via the Cold Spring sewer system, except during periods of overload or system shutdown during which time the process effluent was discharged directly into East Foundry Cove Marsh (EFCM) to the southeast. In 1965, however, the plant began discharging all of the process effluent into EFCM after the New York State Department of Health concluded that the industrial discharge could not be managed by a new sewage treatment system proposed for the Village of Cold Spring. Between November 1972 and July 1973, a limited cleanup was conducted by MBC and other responsible parties, to remove sediment from parts of Foundry Cove and surrounding areas contaminated with cadmium and nickel in excess of 900 mg/kg. Approximately 5,000 yd^3 of cadmium-contaminated sediments were dredged and subsequently placed in a clay-lined underground vault on the plant property. However, studies conducted in Foundry Cove between 1976 to 1980 continued to detect cadmium and nickel concentrations in excess of 900 mg/kg. To expedite remediation, the site has been divided into three separate geographic areas as follows: Area I, EFCM and Constitution Marsh southeast of the plant; Area II, the 11-acre former battery plant grounds, including the former battery manufacturing facility (presently used as a book repository), a production well, a 500,000 gallon water tower, building debris, a dredge spoils vault, a parking lot and nearby residential yards; and Area III, EFC and the portion of the Hudson River in the vicinity of the wastewater discharge pipe on Cold Spring pier. A ROD was signed for Area I in September 1986 with cleanup activities to include dredging the EFCM and replacing the sediments with clay and clean fill. This ROD addresses Area II including localized soil contamination primarily in the area around the building, under debris and around the parking lot; dust inside the building; and the sludge spoils vault. A subsequent ROD will address Area III. The primary contaminants of concern affecting the ground water, soil, debris and inside surfaces of a building in Area II are: VOCs including PCE and TCE, and metals including cadmium and nickel.

The selected remedial action for Area II at this site includes: decontamination of the inside surfaces and contents of the former battery facility to remove the heavy metal-contaminated dust; excavation of both the cadmium-contaminated soil on the battery plant grounds and nearby residential yards, and the dredge spoils vault, followed by onsite fixation of the excavated soil, dust and vault sediments and offsite disposal; excavation of the VOC-contaminated soil hotspots followed by enhanced volatilization and replacement of the clean residuals onsite; backfilling of the excavation areas with clean fill; institutional controls; ground water monitoring; and evaluation and performance of minor repairs, if needed, to the inoperable sprinkler and heating systems inside the former battery facility. The estimated present worth cost for this remedial action is $10,010,000, with annual O&M of $775,000 (year 1) and $17,000 (years 2-30).

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup goals will attain ACLs for indicator compounds that are below federal and state MCLs, if available, and include PCE 0 ug/l and TCE 3 ug/l. These goals will be attained in 3-10 years by natural attenuation. There are no ARARs promulgated for heavy metals; however, excavation of onsite and offsite cadmium-contaminated soils will attain a level of 20 mg/kg.

INSTITUTIONAL CONTROLS: Institutional controls will be implemented to restrict the development of the aquifer for potable or municipal use.

MONTGOMERY TOWNSHIP HOUSING DEVELOPMENT, NJ
Second Remedial Action - Final
June 30, 1988

ROD ABSTRACT

The Montgomery Township Housing Development (MTHD) site is located in Somerset County, New Jersey. The Rocky Hill Municipal Wellfield (RHMW) Superfund site is also covered by this remedial action because of its proximity to the MTHD and the similarity of the contaminants present. The 72-acre MTHD site is a development which includes 71 private homes, with an additional six homes affected by the contamination in the surrounding residential areas. The RHMW consists of a two-acre tract of land in the Borough of Rocky Hill, which supplies public water to the residents of Rocky Hill. In 1978, a study of the RHMW revealed TCE contamination, which led to closure of one well and eventual installation of an air stripping treatment unit on the well in 1983. Concern over the ground water contamination in Rocky Hill spurred the initial sampling of residential wells in MTHD from December 1979 to January 1980. In March 1981, Elizabethtown Water Company water lines were installed in MTHD, and residents were advised not to use well water. Twenty homes initially elected to connect to the municipal supply, and at the present time 38 residences have hooked up. In September 1987, an operable unit ROD was signed by EPA, which provided for the supply of alternate water through the permanent hookup of all MTHD residences and six residences outside of MTHD to the available public water supply system. Field investigations have identified 13 possible sources of contamination. The nearby Princeton Gamma Tech property has been identified as a primary source of TCE contamination in the area. The primary contaminant of concern affecting the ground water is TCE.

The selected remedial action for this site includes: ground water pumping and air stripping and reinjecting the treated water back into the aquifer; connecting any remaining affected residences to the public water supply, sealing the remaining private water supply and monitoring wells within the contaminant plume; and implementing ground water monitoring. Present worth cost for this remedial action is $2,548,000 with annual O&M costs of $94,000.

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup will attain the State MCC for TCE 1.0 ug/l.

INSTITUTIONAL CONTROLS: Water well use restrictions will be implemented.

NASCOLITE, NJ
First Remedial Action
March 31, 1988

ROD ABSTRACT

The Nascolite site is located in the cities of Millville and Vineland, Cumberland County, New Jersey. The 17.5-acre site is wooded and is in a residentially and industrially zoned area. Several homes exist near the site and rely on potable wells for drinking water. Between 1953 and 1980, the Nascolite Corporation manufactured polymethyl methacrylate (MMA) sheets, commmonly known as plexiglass. Waste residues from the distillation of scrap acrylic, a manufacturing by-product, were stored in buried tanks onsite. Perforations in an excavated tank indicated the possibility of liquid waste leaking into the soils. In 1981 and 1983, the New Jersey Department of Environmental Protection (NJDEP) conducted onsite ground water sampling and found significant concentrations of VOCs. NJDEP identified over 100 fifty-five gallon drums and several buried tanks on the site, most of which have been subsequently removed from the site by the property owner. The remaining drums were removed by EPA. The primary contaminants of concern affecting both ground water and soil include: VOCs, base/neutrals, and MMA.

The selected remedial action for this site includes: ground water pump and treatment using a method determined through pilot testing with reinjection into the aquifer; performance of additional soil and onsite building studies to determine appropriate future remedial measures; and provision of an alternate water supply for potentially affected residents. The estimated captial cost for this remedial action is $609,000 with annual O&M of $266,000.

PERFORMANCE STANDARDS OR GOALS: The ROD did not state specific target concentrations for contaminants; however, it indicated that cleanup goals were developed using the Clean Water Act, Safe Drinking Water Act, Solid Waste Disposal Act, New Jersey Safe Drinking Water Act, and the Ground Water Quality Criteria of the New Jersey Administrative Code. Additionally, for carcinogenic compounds without cleanup standards, the 10^{-6} cancer risk cleanup standard will be used. A goal of 50 ug/l total noncarcinogenic and "non-A-280" compounds were selected for any other contaminants.

INSTITUTIONAL CONTROLS: Not applicable.

OLD BETHPAGE, NY
First Remedial Action - Final
March 17, 1988

ROD ABSTRACT

The Old Bethpage landfill, covering approximately 65 acres, is located in Old Bethpage, Town of Oyster Bay, Nassau Country, New York. Two public drinking water wells, a residential community, an industrial park and a state park exist within the site's general vicinity. Beginning in 1958, the Town of Oyster Bay operated the landfill as a municipal landfill. In addition to municipal wastes and garbage, local industrial wastes were disposed of on the landfill during the late 1960s and early 1970s. The landfill ceased operations in April 1986. A system designed to collect, store, treat and dispose of leachate has been operating at the site since 1983. There are three remedial actions currently underway at the site. They include: leachate collection, methane gas collection and landfill capping. The methane gas collection system was installed in phases in 1982 at the periphery of the site to monitor and prevent migration of gas beyond the property boundary. The 18-inch thick clay cap was applied to 29 acres of the landfill. These actions were described in the October 1983 Comprehensive Land Use and Operations Plan prepared in accordance with State landfill closure regulations. The primary contaminants of concern affecting ground water include: VOCs, TCE, benzene, toluene, inorganics, chromium and lead. Air is contaminated with methane gas and VOCs.

The selected remedial action for this site includes: hydraulic control of the plume through installation of ground water recovery wells; ground water pump and treatment using air stripping and, if necessary, carbon filtration with discharge into an upgradient injection well system; ground water monitoring; completion of the landfill capping (29 acres previously capped); continuation and expansion, or enhancement of the leachate control and gas collection systems; and gas monitoring. The estimated present worth cost of this remedial action is $23,045,000.

PERFORMANCE STANDARDS OR GOALS: The plume will be cleaned to New York State Department of Environmental Conservation (NYSDEC) Standards and Guidances, and Technical and Operational Guidance Series, or to a zero-slope condition, if one exists following five or more years of pumping and the application of requisite remedial technology. If additional compounds should be detected (currently 17 inorganics and 25 VOCs specified), the most stringent of the requirements obtained from these sources shall apply. For any VOC without a State value, the applicable limit shall be 50 ug/l. Some individual goals for ground water include: chromium 0.05 mg/l, lead 0.025 mg/l, TCE 5.0 mg/l (MCL), benzene-non-detectable, and toluene 50 mg/l. Air discharge requirements will meet NYSDEC Air Guide No. 1. If more stringent Federal National Ambient Air Quality Standards are promulgate, the more stringent standard shall apply. Some individual goals for air (currently 27 specified) include: methylene chloride 1.17×10^3 ug/m^3, TCE 9.0×10^2 ug/m^3, benzene 1.0×10^2 ug/m^3, and toluene 7.5×10^3 ug/m^3.

INSTITUTIONAL CONTROLS: Not applicable.

REICH FARM, NJ
First Remedial Action - Final
September 30, 1988

ROD ABSTRACT

The Reich Farm site is located in Dover Township, Ocean County, New Jersey. The three-acre site is bounded by commercial establishments to the west and wooded areas in all other directions. The site is approximately one mile northeast of the Toms River, but no floodplains or wetlands are affected by the site. The site is currently owned by Mr. and Mrs. Samuel Reich. In August 1971, they rented a portion of their land to Mr. Nicholas Fernicola for temporary storage of used 55-gallon drums. That December, the Reichs discovered approximately 4,500 drums containing wastes and 450 empty drums on that portion of their property. Most of the drums had Union Carbide Corporation (UCC) markings on them, with labels reading "tar pitch," "lab waste solvent," "blend of resin and oil," and "solvent wash of process stream" among others. The site first came to the attention of the New Jersey Superior Court when the Reichs filed suit against Mr. Fernicola and UCC. UCC undertook drum removal and completed the work in March 1972. In June 1974, another 51 drums and approximately 1,100 yd^3 of contaminated soil and trenched wastes were removed from the site, but residents near the site had already complained about unusual taste and odor in their well water. Based on results of an extensive sampling program, the Dover Township Board of Health ordered 148 private wells closed and established a zoning ordinance restricting ground water use in the area of Reich Farm. The volume of contaminated soil remaining at the site is estimated to be 2,010 yd^3. The primary contaminants of concern affecting the ground water and soils are VOCs including 1,1,1-trichloroethane (TCA), TCE, PCE, and semi-volatile organics compounds (SVOCs).

The selected remedial action for this site includes: additional ground water sampling to further delineate the leading edge of the contaminant plume and additional soil sampling to support existing data on contaminants of concern at the site; ground water pump and treatment using air stripping and carbon adsorption with reinjection of the treated water back into the aquifer; excavation and storage of surface soils onsite which do not require remediation; excavation of subsurface soils and onsite treatment by enhanced volatilization and onsite disposal, or shipment of subsurface soils which cannot be treated onsite to an offsite RCRA-permitted facility for incineration and disposal, followed by backfilling excavated areas with clean surface soils. The estimated present worth cost for this remedial action is $5,832,000, which includes annual O&M costs of $419,550.

PERFORMANCE STANDARDS OR GOALS: The cleanup objectives for ground water will meet the more stringent State of New Jersey MCLs for TCA 26 ug/l, TCE 1 ug/l, and PCE 1 ug/l. Cleanup objectives for the soil remediation will meet the New Jersey Department of Environmental Protection Soil Action Levels of 1 mg/kg total VOCs and 10 mg/kg SVOCs.

INSTITUTIONAL CONTROLS: Not applicable.

RINGWOOD MINES/LANDFILL, NJ
First Remedial Action - Final
September 29, 1988

ROD ABSTRACT

The Ringwood Mines/Landfill site consists of approximately 500 acres in a historic mining district in Ringwood Borough, Passaic County, New Jersey. The mines lie west of and adjacent to the Town of Ringwood and one mile northwest of Wanaque Reservoir. The site is characterized by a variety of features including abandoned mine shafts and surface pits, an inactive landfill, an industrial refuse disposal area, small surficial dumps, a municipal recycling area, a municipal garage, and approximately 50 residences. Ground water beneath the site discharges to surface streams and the Wanaque Reservoir. The Ringwood mines are a series of iron ore mines that operated from the mid-1700s to the early 1900s and possibly even later. The site was purchased by the U.S. Government prior to 1940, and later sold to a succession of owners including Ringwood Realty Corporation (RRC), a subsidiary of Ford Motor Company (Ford), in January 1965. Between 1967 and 1974, RRC deposited waste products for Ford, including car parts, solvents and paint sludges, on the ground surface and in abandoned mine shafts. In 1970, RRC donated 290 acres in the southern portion of the site to Ringwood Solid Waste Management Authority (RSWM), which began operating a permitted municipal disposal area in March 1972. In 1976, the New Jersey Department of Environmental Protection (NJDEP) closed the landfill after determining that leachate emanating from the landfill was contaminating surface water in the area. In July 1982, NJDEP detected moderate levels of VOCs, as well as naturally occurring heavy metals, in ground water in the northern section of the site, which had been retained by RRC and a portion used for industrial waste disposal. The site was subsequently divided into four discrete areas for investigation. Between October 1987 and February 1988, Ford International Services, Inc., conducted a removal action, entailing excavation and offsite disposal of 7,000 yd^3 of surficial paint sludge containing lead and arsenic from four onsite areas. Subsequent sampling, however, indicated that soil within a small area (less than one acre) still contains concentrations of lead and total petroleum hydrocarbons in excess of health-based levels. Furthermore, there is sporadic and moderate ground water contamination, generally confined to paint sludge locations, exceeding MCLs for lead and arsenic. The primary contaminants of concern affecting the soil and ground water are arsenic, lead, and petroleum hydrocarbons.

The selected remedial action for this site includes: confirmatory sampling of soil with excavation and offsite disposal of any soil exceeding health-based levels, followed by backfilling and revegetation; and ground water, surface water and wetlands monitoring. Since ground water in the vicinity of the paint sludge areas is not used as a drinking water source and natural attenuation is expected to reduce contamination levels of below health based levels after removal of the source, ground water will not be treated. The estimated capital cost for this remedial action is $225,000 with annual O&M of $50,000.

PERFORMANCE STANDARDS OR GOALS: Soil cleanup will attain the non-promulgated New Jersey Cleanup Objectives for lead 250 mg/kg and total petroleum hydrocarbons 100 mg/kg. Ground water will attain MCLs, including arsenic 50 ug/l and lead 50 ug/l, by natural attenuation.

INSTITUTIONAL CONTROLS: Not applicable.

ROCKY HILL, NJ
First Remedial Action - Final
June 30, 1988

ROD ABSTRACT

The 2-acre Rocky Hill Municipal Well Field site (RHMW) is located in Montgomery Township, Somerset County, New Jersey. Montgomery Township Housing Development (MTHD), located north of the well field contains 77 private homes. RHMW is listed on both the State and National Registers of Historic Places. Additionally, a nearby corridor has a potential for archaeological significance. Two wells, numbered 1 and 2, were constructed in 1936 to provide a source of potable water to the Borough of Rocky Hill (BRH). A 1978 Rutgers University study revealed TCE contamination levels in Well 1, and it was abandoned and sealed by 1978. Further testing, conducted between 1978 and 1983, revealed cycles of elevated levels of TCE in Well 2. It was closed in November 1979. Declining levels of TCE in the well field resulted in the reopening of the well; however, levels increased and the well was again closed in January of 1982. During the shutdown of Well 2, BRH obtained potable water from the privately-owned Elizabethtown Water Company. After the installation of two air stripping units by the borough, Well 2 reopened as a potable water source. Recently, 38 MTHD residents elected to connect to the municipal supply. The first operable unit ROD, signed in September 1987, provided for the supply of alternate water through the permanent hookup of all remaining MTHD residences and 6 residences outside of MTHD. Approximately 13 possible sources of contamination are under evaluation. TCE is the most predominant site contaminant, both with respect to concentration and areal extent. Several additional components such as chlordane and metals are sporadically present; however, these compounds were not considered to be related to the TCE contamination.

The selected remedial action for this site includes: ground water pump and treatment using air stripping with reinjection; connection of any remaining affected residences to the public water supply; sealing remaining private water supply and monitoring wells within the contamination plume; and implementation of ground water sampling program to monitor the effectiveness of the cleanup. The estimated capital cost for this remedial action is $1,618,000 with annual O&M of $84,000.

PERFORMANCE STANDARDS OR GOALS: The objective of remediation is to reduce the entire ground water concentration of TCE to 1 ug/l. This level is a proposed New Jersey MCL which is expected to be promulgated in the near future. It is being used in place of the federal MCL of 5 ug/l. PCE and 1,1-dichloroethene will be reduced to below 1 ug/l and 2 ug/l, respectively. The remedy will meet a 0.12 x 10^{-6} excess cancer risk level.

INSTITUTIONAL CONTROLS: In January 1986, the New Jersey Department of Environmental Protection, Division of Water Resources, placed a restriction on future well drilling for water supply wells in the area.

TABERNACLE DRUM DUMP, NJ
First Remedial Action - Final
June 30, 1988

ROD ABSTRACT

The Tabernacle Drum Dump (TDD) site is a one-acre parcel of undeveloped land located in Tabernacle Township, Burlington County, New Jersey. Drum disposal activities, which resulted in contamination by hazardous substances, occurred on a 2,000 ft^2 area portion of the site. Land use in the area consists mainly of woodland, bogs, agriculture and recreation. The soils typically found in the area are highly permeable, sandy, and acidic. Approximately 75 to 100 residents live within a one-mile radius of the site. Most of the residents located down-gradient of the site depend on individual residential wells for potable and agricultural purposes. TDD is currently owned by Mr. and Mrs. Phillip Myers. In 1976 and 1977, the property was occupied by Mr. and Mrs. Robert Ware. During that period, Mr. Ware's employer, the Atlantic Disposal Services (ADS), disposed of approximately 200 containers, including fifty-five gallon drums, twenty gallon containers, and five gallon paint cans. These containers were stored at the site between 1977 to 1984. Deterioration and leakage of some containers resulted in visible soil contamination and ultimately ground water contamination. Based on a referral from Tabernacle Township officials, the Burlington County Health Department conducted a site inspection in August 1982, and discovered over 100 abandoned drums. In November 1982, the New Jersey Department of Environmental Protection (NJDEP) conducted a more detailed site inspection. Leaking and deteriorated drums containing solvents, paint sludges, heavy metals, and visibly contaminated surface soils were revealed. In 1984, EPA issued an administrative order to ADS requiring it to perform a surface cleanup of the site, install and sample four monitoring wells, and sample and analyze site surface and subsurface soils for priority pollutants. During April 1984, ADS initiated some remedial measures including the numbering, logging and sampling of site containers. Surface cleanup was completed in July 1984 and consisted of removing containers, 40 yd^3 of drum material, eight truck loads of excavated soil, and approximately 3,000 gallons of liquid material. The principle threat posed at the site is potential ingestion of ground water by down-gradient residents. The primary contaminants of concern are VOCs including 1,1,1-trichloroethane (TCA) and 1,1-dichloroethene (DCE).

The selected remedial action for this site includes: installation of ground water monitoring wells to further delineate the extent of the plume and implementation of a monitoring program for downgradient residential wells; ground water pump and treatment using air stripping and possibly carbon adsorption followed by reinjection, ground water monitoring and exhaust gas analysis; and soil sampling of the former drum dumping and storage area. The estimated capital cost for this remedial action is $772,600 with present worth 0&M of $215,600.

PERFORMANCE STANDARDS OR GOALS: The proposed MCLs established by NJDEP are more stringent than federal standards and include 1,1,1-TCA 26 ug/l and DCE 2 ug/1. The remedial action will comply with NJDEP levels in anticipation that they will become State ARARs. The levels of contaminants found in the surface soils did not exceed the existing soil ARARs established by NJDEP.

INSTITUTIONAL CONTROLS: Not applicable.

UPJOHN MANUFACTURING COMPANY, PR
First Remedial Action - Final
September 30, 1988

ROD ABSTRACT

The Upjohn Manufacturing Company (UMC) site is located in the Barceloneta industrial park on the north coast of Puerto Rico. Land use in the surrounding area is industrial, agricultural, and rural residential. The site is in a sparsely populated rural region and lies above the island's largest aquifer, which serves as a source of drinking water for over 12,000 area residents. In addition, the aquifer discharges to a wetland area to the north, which supports a large aquatic and bird population. The site lies in a limestone region characterized by karst terrain developed by dissolution of the existing limestone formations and typified by closed depressions, sinkholes, and subsurface conduits. Between August and September 1982, UMC dispatched approximately 15,300 gallons of a manufacturing by-product waste mixture estimated to be comprised of 65 percent carbon tetrachloride and 35 percent acetonitrile to a leaking underground storage tank (UST), resulting in the release of all of the waste into the ground. Investigation by UMC determined that carbon tetrachloride contamination had migrated offsite approximately two miles to the north and occupied an area of about 2.1 mi^2. Consequently, five local water supply wells were closed in 1982 due to the potential for carbon tetrachloride contamination, and UMC provided a permanent alternate water supply to users. In 1983, UMC began implementing remedial actions to remove carbon tetrachloride from the soil and ground water: this included the installation and operation of a vacuum extraction system until March 1988; ground water pumpage from the AH Robins well adjacent to and north of the site until 1985; installation and operation of a second ground water contaminant recovery extraction well, UE-1, on the UMC facility in 1984, with air stripping and residual discharge to a sinkhole; and placement of a concrete cap over the tank farm. In 1987, because of residual ground water contamination that has remained both on and offsite, EPA ordered UMC to continue its remedial activities including resuming operation of the vacuum extraction system, pumping extraction well UE-1, and ground water monitoring, as well as determining the feasibility of restoring all or portions of the aquifer to health-based levels. This ROD addresses the residual ground water contamination resulting from the 1982 UST leak at the UMC facility. The possibility of residual contamination in the soil as a continuing source of carbon tetrachloride contamination in the ground water will be addressed by the EPA RCRA program and will not be a part of this remedial action. The primary contaminant of concern affecting the ground water is carbon tetrachloride.

The selected remedial action for this site includes: ground water pump and treatment from the UE-1 and AH Robins wells using air-stripping, followed by discharge of the treated water to an existing sinkhole; ground water pump and treatment using air stripping from the public supply well followed by distribution to the public water supply system; installation and operation of two to four additional offsite extraction wells with air stripping and recharge to the ground water; installation of chloride monitoring wells near the coastline to monitor potential salt-water encroachment; and long-term ground water monitoring. Because it is not known whether contaminant levels in the aquifer can be reduced to the MCL, EPA will re-evaluate this remedy within five years of operation to determine the allowable contaminant levels that must be met before the extraction wells are shut down. If a decision is made that any portion of the aquifer will not be restored, a waiver from the MCL for reasons of technical impracticability will be evaluated at that time. The estimated capital cost for this interim remedial action is \$2,200,000-\$6,200,000 with annual O&M of \$400,000-\$700,000.

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup levels will meet the MCL for carbon tetrachloride of 5 ug/l.

INSTITUTIONAL CONTROLS: Not applicable.

YORK OIL, NY
First Remedial Action
February 9, 1988

ROD ABSTRACT

The York Oil Company site, encompassing 17 acres, is located in the Hamlet of Moira, Franklin County, New York. Wetlands and woodlands are the principal land use in the vicinity of the site. Residences exist along the main roads interspersed with active/inactive agricultural and pasture land. The now dissolved York Oil Company operated a waste oil recycling facility from approximately 1964 to 1977. Crankcase industrial oils, some containing PCBs, were collected from sources throughout New England and New York, then stored and/or processed at the site in eight above-ground storage tanks, a series of three earthen-damned settling lagoons, and at least one below-ground storage tank. The recycled PCB-contaminated oil was either sold as No. 2 fuel oil or used in dust control for the unpaved roads in the vicinity of the site. During heavy rains and spring thaws, the oil-water emulsion from the lagoons would often overflow onto the surrounding lands. In 1964, in lieu of paying damages to adjacent farm-owners, the oil company purchased land in the area of the spills. The York Oil site contamination was first discovered in 1979 by a New York State Department of Transportation road crew, who then notified the New York State Department of Environmental Conservation (NYSDEC). Several interim actions have been undertaken at the site to contain the PCB-contamination problem. Currently, soils, sediments, ground water and surface water are contaminated with PCBs, VOCs, metals and phenols.

The selected remedial action for this site includes: excavation of approximately 22,000 yd^3 of contaminated soil and approximately 8,000 yd^3 of contaminated sediments with onsite solidification followed by onsite disposal of treatment residuals; installation of deep ground water drawdown wells and shallow dewatering wells to collect the sinking contaminant plume and the oil during excavation, with onsite treatment and subsequent discharge in accordance with New York State discharge requirements; offsite thermal treatment of approximately 25,000 gallons of contaminated tank oils in addition to other oils collected at the site; cleaning and demolition of the empty storage tanks; and grading. Treatability studies will be conducted during remedial design to determine the effectiveness of the solidification process in meeting specified treatment levels and to determine the optimal treatment system for ground water. The estimated capital cost for this remedial action is $6,500,000 with present worth O&M of $500,000.

PERFORMANCE STANDARDS OR GOALS: The cleanup level for PCBs in soil of 10 mg/kg was derived based on the current New York State goal to clean up uncontrolled PCB sites in residential areas to a level less than 10 mg/kg, and on the Toxic Substances Control Act PCB Spill Clean Policy which states that "PCB spills in residential areas ... [should] ... be remediated to 10 mg/kg." The clean level for total phenols in ground water is 100 ug/l in accordance with New York State Ambient Water Quality Guidelines.

INSTITUTIONAL CONTROLS: Not applicable.

ALADDIN PLATING, PA
First Remedial Action
September 27, 1988

ROD ABSTRACT

The two-acre Aladdin Plating site is a former electroplating facility located in Scott and Abington Townships, Lackawanna County, Pennsylvania, approximately 1.5 miles north of the Town of Chinchilla. The area surrounding the site is wooded, with four residences within 100 yards and about 120 people living within a 0.25 mile radius. Approximately 11,000 people within three miles of the site use domestic and public ground water wells for drinking water. Site runoff flows northwest toward Leggetts Creek, a principal tributary of Griffin Pond Reservoir. Leggetts Creek and Griffin Pond are sources of supplemental drinking water for more than 100,000 people. The nearest residential well is less than 1,500 feet from the site. Aladdin Plating conducted electroplating operations from 1947 to 1982. Hazardous materials used in operations include sulphuric acid, chromic acid, cyanide, chromium and other heavy metals. For 35 years, electroplating waste effluents containing heavy metals and other contaminants were discharged via a ditch and underground pipes to a shallow surface lagoon near the electroplating building. A fire destroyed the facility and ended operations in 1982. Three source areas of contamination have been identified: the site of the former plating facility building, a buried trench (presumably the building's floor drain), and the lagoon. In 1983, chromium was detected in onsite soils. Subsequent testing by EPA in 1984 also identified lead and cyanide in onsite soils. In addition, ground water samples from onsite monitoring wells showed significant levels of arsenic, cadmium, chromium, and lead; all exceeded their respective MCLs. In March 1987, EPA performed emergency response activities to remove significant immediate health threats. These responses included fencing contaminated zones and removing drums and vats containing hazardous wastes. This response action addresses only the remediation of the contaminated soil onsite. The ground water contamination will be addressed in a subsequent remedial action. The primary contaminants of concern affecting the soil and ground water are arsenic, chromium, and lead.

The selected remedial action for this site includes: excavation and offsite stabilization of approximately 12,000 yd^3 of contaminated soil, with disposal of the treated soil in an offsite landfill and replacement of the excavated soil with clean fill. The estimated present worth cost for this remedial action is $4,461,000 with no associated O&M costs.

PERFORMANCE STANDARDS OR GOALS: Soils will be excavated to a depth where chromium contamination is 50 mg/kg or less.

INSTITUTIONAL CONTROLS: Not applicable.

AMBLER ASBESTOS PILES, PA
First Remedial Action
September 30, 1988

ROD ABSTRACT

The Ambler Asbestos Piles site is located in the southwestern portion of the Borough of Ambler, Montgomery County, Pennsylvania. Land around the site is used for industrial, residential, commercial, and transportation purposes. The site is bordered on the west by Wissahickon Creek and its flood plain. A low density housing development lies to the southwest. The site consists of four distinct areas of asbestos contamination: the Locust Street Pile, the Plant Pile, the Pipe Plant Dump, and the asbestos settling basins/filter bed lagoons. The waste piles of concern in this operable unit are the Locust Street Pile and the Plant Pile. Within a 0.25 mile radius of the Locust Street Pile are approximately 40 residences and a public playground that was closed in 1984. The K&M Company owned and operated the site from the late 1800s to 1962 and produced asbestos products such as paper, millboard, electrical insulation, linings, conveyor belts, and high pressure peckings. The primary wastes generated and disposed of in the Locust Street and Plant Piles during that period were spent magnesium/calcium (from pharmaceutical operations) and asbestos process waste. In 1962, Certainteed Corporation purchased a portion of the site and facilities from K&M and manufactured asbestos-cement pipe at the plant. Nicolet Industries, Inc. purchased the remainder of the site and manufactured asbestos millboard and monolithic products. The Locust Street Pile continued to receive asbestos waste from Nicolet until sometime after 1964; however, waste continued to be deposited on the Plant Pile until 1980. EPA and the Pennsylvania Department of Environmental Resources conducted their first investigation of the site in 1971, noting visible emissions and substantial dust concentrations attributed to asbestos. Subsequent investigations of the surface water, bulk waste samples, and air samples in 1983 revealed asbestos contamination. In September 1983, the Centers for Disease Control issued a Public Health Advisory recommending the closure of the nearby playground. In 1984, EPA implemented emergency response actions to establish a soil and vegetative cover, install a drainage system, and provide erosion control measures over the Locust Pile. In addition, Nicolet had covered the Plant Pile by June 1984. The primary contaminant of concern affecting the sediments, surface water, and debris is asbestos.

The selected remedial action for this site includes: installation of a geotextile and soil cover on the exposed areas of waste piles; erosion control/repair on waste pile slopes to facilitate vegetation; pump and treatment (using filters) of surface water from lagoon and settling basins with onsite discharge, backfilling and regrading lagoon and settling basins to promote positive drainage and onsite disposal of collected sediments and asbestos on the waste piles; implementation of slope stability control measures, if deemed necessary after testing; installation of gabions or rip-rap to prevent scouring action of Wissahickon Creek on the waste piles; runoff collection and treatment; preparation of a contingency plan; and access restructions. The estimated capital cost for this remedial action is $5,135,000, with estimated annual O&M costs of $46,000 to $63,000 for years 2 through 6 and $33,000 for years 6 through 30.

PERFORMANCE STANDARDS OR GOALS: Remedy addresses containment of asbestos-contaminated debris; therefore, no cleanup level is provided for the debris. Surface water treatment will meet State NPDES requirements. Individual cleanup goals not provided.

INSTITUTIONAL CONTROLS: Not applicable.

AVTEX FIBERS, VA
First Remedial Action
September 30, 1988

ROD ABSTRACT

The 440-acre Avtex Fibers site is located in Warren County, Front Royal, Virginia. The facility is bounded to the west and northwest by the Shenandoah River and to the south, northwest, and east by residential areas. Approximately 1,300 people live within one mile of the site. The western part of the site lies within the limits of the Shenandoah River's 100-year floodplain. The Avtex Fibers site has produced rayon fibers since 1940, polyester between 1970 and 1977, and polypropylene since 1985. During this 48-year period, byproducts from the rayon manufacturing process were disposed of in onsite surface impoundments. These byproducts included sodium cellulose xanthate-based viscose and zinc-hydroxide sludge. Fly ash (from incinerator exhaust air pollution control devices) and boiler house solids were disposed of in five other surface impoundments. Land disposal of viscose waste ceased in 1983; since that time, the waste has been routed directly to an onsite wastewater treatment plant. In 1982, carbon disulfide, a constituent of viscose waste, was identified in ground water samples from residential wells located across the Shenandoah River from the site. In response to the results of a ground water investigation, Avtex implemented interim measures, which included purchasing 23 subdivision properties on the west side of the river that had contaminated domestic wells, and initiating a ground water pump and treatment program. This ROD is the first of two operable units and addresses ground water remediation and interim remedial measures for the viscose basins responsible for ground water contamination. A subsequent remedial action will address source control and viscose basin remediation. The primary contaminants of concern affecting the ground water are phenols, and metals including arsenic and lead.

The selected remedial action for this site includes: ground water and basin liquid pump and treatment in the existing onsite activated sludge wastewater treatment plant, following completion of necessary upgrades, modifications, and construction of pretreatment units, with offsite discharge of treated water to the Shenandoah River; monitoring on- and offsite ground water, surface water, and basin fluids; and placing deed restrictions prohibiting the use of ground water on the affected properties. The estimated present worth cost for this remedial action is $9,122,000.

PERFORMANCE STANDARDS OR GOALS: Ground water will be treated to meet MCLs, EPA References Dose-based water limits, Federal AWQC and State Drinking Water Standards. Individual goals include phenols 0.3 mg/l (AWQC), lead 0.05 mg/l (MCL/VAGWS), and arsenic 0.05 mg/l (MCL/VAGWC). When the aquifer restoration goals are attained, the hazard index for ingestion of ground water will be less than 1 for the noncarcinogen contaminants in the ground water.

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to prohibit the use of ground water on the affected properties.

BENDIX, PA
First Remedial Action - Final
September 30, 1988

ROD ABSTRACT

The Bendix site is an aircraft instruments manufacturing plant located near the Village of South Montrose, Bridgewater Township, Susquehanna County, Pennsylvania. The 60-acre site is situated in a sparsely populated area (approximately 500 people) atop a topographic divide between the Meshoppen Creek and Wyalusing Creek watersheds. Natural ground water discharge areas exist east of the site in a wetlands area of Meshoppen Creek, and west of the site at the headwaters of Wyalusing Creek. South Montrose is solely dependent on private ground water wells for water. The Bendix Corporation (Bendix) acquired the parcels of land comprising the site in 1951 and 1952, was acquired by Allied Corporation (Allied) in 1983, and finally merged into Allied in 1985. Allied is the current owner of the property. From 1952 to 1958 industrial solvent wastes were disposed of in a lagoon northeast of the plant, and for several years similar wastes also were disposed of in a series of onsite small trenches east of the plant. In addition, from the early 1950s until 1978, an earthen disposal pit installed by Bendix was used for the disposal of water-soluble cutting oil and oil-contaminated water from air compressors. The basin was drained of free liquids, backfilled, and seeded in late 1978. Investigations performed by Bendix from 1984 through 1987 indicated that as a result of past disposal practices, contamination from subsurface soil has been leaching into the underlying ground water. Five source areas of contamination have been identified at the site: a TCE storage tank area, the pet/trench area, an old landfill area, the area of a former solvent evaporation facility, and a former drum storage area behind the plant building. Bendix is currently supplying carbon filter units to users of affected wells. The primary contaminants of concern affecting the ground water and soil are VOCs including TCE.

The selected remedial action for this site includes: soil vacuum extraction and soil aeration; onsite ground water pump and treatment with air stripping; and treatment of offsite ground water contamination through carbon adsorption at the well heads. The estimated present worth cost for this remedial action is $4,487,000 with annual O&M costs of $542,000.

PERFORMANCE STANDARDS OR GOALS: Both on- and offsite ground water cleanup goals have been set at less than 1 ug/1 TCE. Soil will be cleaned to 100 ug/kg leachable VOCs based on the ground water cleanup goal.

INSTITUTIONAL CONTROLS: Not applicable.

BERKS SAND PIT, PA
First Remedial Action - Final
September 29, 1988

ROD ABSTRACT

The three to four-acre Berks Sand Pit site is located in Longswamp Township, Berks County, Pennsylvania. There are at least 20 single family homes within the investigation area, including one on top of the actual sand pit. The immediate vicinity of the site is zoned for low density residential use. The Berks Sand Pit was created by the removal of sand and gravel, but reportedly was used by area residents for refuse disposal. Industrial waste also was alleged to have been disposed of in the area around the pit. Houses were constructed and private wells installed at the location beginning in 1978, after the pit was backfilled. The site first came to the attention of EPA in January 1982 when area residents detected ground water contamination. Emergency actions were undertaken by EPA in the summer of 1983. The pit was partially excavated and backfilled with clean fill, but no pocket of contamination was discovered. The primary contaminants of concern affecting the ground water, surface water, and sediments are VOCs including 1,1,1-TCA, 1,1-DCA, PCE, and 1,1-DCE.

The selected remedial action for this site includes: excavation of contaminated sediments with offsite treatment by incineration; ground water pump and treatment using air stripping and vapor phase carbon absorption with reinjection of treated water back into the aquifer; provision of an alternate water supply system, surface and ground water monitoring; and restrictions to prevent installation of drinking water wells in the contaminated aquifer. The estimated present worth cost for this remedy is $10,773,100, with annual O&M costs of $459,200.

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup goals will attain health-based MCLs for 1,1,1-TCA 200 ug/1 and 1,1-DCE 7 ug/1. Secondary target levels, based on published Unit Cancer Risk, will be met for 1,1-DCE and PCE 1.0 ug/1. Reinjection of treated ground water into the aquifer will meet Underground Injection Control requirements.

INSTITUTIONAL CONTROLS: Not applicable.

CHISMAN CREEK, VA
Second Operable Unit - Final
March 31, 1988

ROD ABSTRACT

The Chisman Creek site is located near Grafton in York County, Virginia. This ROD addresses operable unit two, which consists of three ponds (designated A, B, and C), the freshwater tributary, and the Chisman Creek estuary. The site is located within the watershed of Chisman Creek, a tributary of the Chesapeake Bay. Approximately 500 to 1,000 people live within one mile of the site. Between 1957 and 1974, fly ash from the Virginia Power Yorktown Power Generating Station was disposed of in four abandoned sand and gravel borrow pits located approximately two miles south of the generating station. The fly ash disposal areas, designated Areas A, B, C, and D, became known as the Chisman Creek Superfund site. Between 1971 and 1973, all fly ash in Area D was removed and deposited in Area C. Area D was reportedly filled with construction rubble generated during the construction of public utilities in the area at that time. After a domestic well showed discolored water in 1980, the Virginia State Water Control Board (SWCB) and Virginia State Board of Health sampled residential ground water in the vicinity of the fly ash areas to determine the types and concentrations of contaminants present. The Virginia Institute of Marine Science and SWCB conducted additional studies to determine the nature and extent of area contamination. The first operable unit ROD was signed in September 1986. The remedial action, begun in November 1987, includes: placing a soil cover on two areas and a clay cap on a third area; relocating a portion of the tributary; providing an alternate water supply for residential areas; and post-closure monitoring. At the request of EPA, the U.S. Fish and Wildlife Service conducted the second operable unit remedial investigation to evaluate the impact of contaminants at the site on fish and wildlife resources and their habitat. Chemical analysis of the physical environment and biota of the site for operable unit two focused on eight metals. These were arsenic, cadmium, copper, lead, nickel, selenium, vanadium, and zinc. The most ubiquitous and abundant metals were nickel and vanadium. Bioassays showed the surface water quality in Ponds B and C to be below ARAR levels, and sediment from the Chisman Creek estuary to have no adverse impacts from the contaminants. Fish from the freshwater ponds and oysters from Chisman Creek have not been impacted. Human health risks from consumption of fish and oysters, or accidental ingestion of surface water and sediments are all within EPA guidelines for acceptable risks. The primary contaminants of concern affecting surface water in Area A include nickel and vanadium.

The selected remedial action for this site includes: diversion of surface runoff from Area A (covered with soil in Operable Unit One) into Pond A and water quality monitoring to evaluate the effectiveness of both operable units. The estimated present worth cost for this remedial action is $137,000.

PERFORMANCE STANDARDS OR GOALS: An ARAR for vanadium has not been promulgated. However, EPA has recently developed an unpublished Estimated Advisory Concentration for vanadium of 7.7 ug/l which will be met in freshwater systems. Remediation will attain the Clean Water Act level for nickel 13.4 mg/kg.

INSTITUTIONAL CONTROLS: Not applicable.

DELAWARE SAND & GRAVEL, DE
First Remedial Action - Final
April 22, 1988

ROD ABSTRACT

The Delaware Sand & Gravel (DS&G) site is a 27-acre inactive industrial waste landfill located in New Castle County, Delaware. It is bordered by Army Creek to the west, Army Creek and wetlands to the north, residential and business facilities to the east and an abandoned sand and gravel quarry to the south. Also to the west of the site directly across Army Creek is the Army Creek Landfill NPL site. Residences are located approximately 30 feet from the landfill and a residential development is located approximately 0.5 miles south and southwest of the site. Underlying the landfill is the Potomac Aquifer, which is accessed about 1.25 miles south of the site and used as a public water source. The DS&G site consists of four disposal areas, referred to as the Drum Disposal, Inert Disposal, Ridge, and Grantham South areas. Between 1968 and 1976 the site accepted household and construction wastes and approximately 7,000 drums containing liquids and sludges from perfume, plastics, paint, and petroleum refining processes. In 1971, investigations revealed ground water contamination emanating from the Army Creek and DS&G landfills. In 1976, the Delaware Department of Natural Resources and Environmental Control issued an enforcement action requiring DS&G to discontinue disposal activities. A ground water recovery system was installed to prevent contaminated water from reaching the nearby private wellfield, which continues to operate. Investigations were conducted to characterize the source and extent of contamination from both sites, and in 1984 EPA initiated an emergency removal action at the DS&G site to remove approximately 600 drums from the Drum Disposal area. An estimated 535,000 yd^3 of waste material are located onsite. Wastes identified in the Drum Disposal area include subsurface soil and debris contaminated with PCBs, organic liquids, and inorganic solids. The Drum Disposal area is believed to be the major source of organic ground water contamination. The Ridge area consists of contaminated surficial soil and drums, storage tanks, and debris scattered on the surface. The Inert Disposal area contains various domestic waste, cars, trucks, and storage tanks scattered on the surface. The Grantham South area is believed to contain surficial inert waste as well as deposited chemical wastes. Two hot spots of organic contamination were identified in this area. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, toluene and xylenes, other organics including PCBs, PAHs and phenols, and metals including chromium and lead.

The selected remedial action for this site includes: excavation and onsite mobile incineration of approximately 36,000 tons of contaminated soil and wastes from the Drum Disposal and Ridge areas, with on- or offsite disposal of residual ash and grading and revegetation of excavated areas; removal and offsite disposal of all surface debris material from the Inert area, followed by capping; construction of a RCRA cap over the Grantham South area; ground water pump and treatment with discharge to Army Creek; and ground water monitoring. The estimated present worth cost for this remedial action is $24,944,000.

PERFORMANCE STANDARDS OR GOALS: The ground water remedy will result in MCLs or 10^{-6} risk levels being met at the site boundary. Ground water treatment will attain the levels specified in the NPDES regulations before being discharged to Army Creek. Individual goals were not specified. Excavation in the Drum Disposal area will attain soil contaminant levels based on acceptable drinking water exposure, including toluene 6,000 mg/kg, xylene 4.8 mg/kg and phenol 497 mg/kg.

INSTITUTIONAL CONTROLS: Not applicable.

DORNEY ROAD LANDFILL, PA
First Remedial Action
September 29, 1988

ROD ABSTRACT

The Dorney Road Landfill site is located in Lehigh County, Pennsylvania. The site is approximately 27 acres, bounded on the east by Dorney Road, and extends westward such that the southwest corner is in Longswamp Township, Berks County. Land use in the area is rural, residential, and agricultural. The population within an 0.25 mile radius of the site is estimated to be approximately 20 people. Currently, one residence is located within 1,000 feet of the site and three residences are within 2,000 feet of the site. The water supply for these nearby homes is ground water from private wells. Beginning in 1952, an abandoned iron mine pit on the site was used as an open dump. From 1966 to 1978, an unpermitted landfill was operated in the same mine pit. In 1986, EPA conducted a removal action and regraded the landfill to prevent runoff and erosion of landfill material from migrating to neighboring property. In 1980 and 1982, EPA investigations revealed elevated levels of VOCs, metals and phenols in ground water and leachate samples. This remedial action will prevent dermal contact and incidental ingestion of landfill soil and solid waste. It will also minimize the continued leaching of precipitation and onsite ponded waters through the contaminated landfill. A subsequent remedial action will address the ground water under the site. The primary contaminants of concern affecting the soil, ground water, and surface water are VOCs including benzene, toluene, and xylenes, metals including arsenic and chromium, and other organics including phenol and PAHs.

The selected remedial action for this site includes: offsite disposal of approximately 700,000 gallons of onsite pond water; construction of a dike and diversion ditch system to control runon/runoff; regrading and installation of a multi-layer landfill cap and a gas collection system; ground water monitoring; and deed and access restrictions. The estimated present worth cost for this remedial action is $14,000,000 with estimated annual O&M costs of $42,000.

PERFORMANCE STANDARDS OR GOALS: The remedy will reduce the cancer risk to below the 10^{-6} level.

INSTITUTIONAL CONTROLS: A notice will be placed on the land deed within site boundaries.

DOUGLASSVILLE DISPOSAL, PA
Second Remedial Action
June 24, 1988

ROD ABSTRACT

The Douglassville Disposal site occupies approximately 50 acres of land in Union Township, Berks County, Pennsylvania. It is almost entirely within the 100-year floodplain of the Schuylkill River. In 1941, Berks Associates began recycling lubrication oil at the site; waste solvents were recycled in the 1950s and 1960s. Wastes generated from those recycling processes were stored in onsite lagoons from 1941 until 1972. In November 1970, heavy rains caused the lagoons to overflow and release 2,000,000 - 3,000,000 gallons of wastes down the Schuylkill River. Federal and State actions were initiated to dispose of the waste material remaining in the lagoons. Before this action could be carried out, heavy rains from a hurricane caused the river to overflow its banks and inundate the entire site area in June 1972. An estimated 6,000,0000 - 8,000,000 gallons of wastes were carried by floodwaters downstream for about 15 miles. During cleanup after the storm, the lagoons were drained and backfilled by EPA. Lubrication oil recycling operations continued at the site until 1979 when the operator determined operational correction, mandated by the Pennsylvania Department of Environmental Resources (PADER), were cost prohibitive. Operations then turned to the practice of refining waste oils for use as fuel in industrial boilers. Beginning in 1979, oily waste sludge from the new recycling process was landfarmed onsite. This practice was halted in 1981 when PADER mandated operational corrections to the landfarming practices. In late 1985, all oil recycling operations at the facility were completely discontinued. This operable unit addresses the 3-4 acre area in the southern most portion of the site and is hydraulically upgradient of the rest of the site. The area consists of a concrete building, process equipment, piping, and at least 57 process tanks. The tanks are constructed of wood, concrete, or steel and range in size from 3,000 gallons to 600,000 gallons. Approximately 200,000 gallons of PCB and lead contaminated oil and waste sludges remain in the tanks. The buildings, tanks, tank wastes, and processing equipment are impediments to any future soil and ground water remediation and are a source of continuing contamination of these media. The primary contaminants of concern include: VOCs, PCBs, PAHs, and lead.

The selected remedial action for this site includes: removal of liquid and sludge tank waste with transportation to an offsite incineration facility; decontamination of tanks, piping, processing equipment, and building materials; offsite disposal of building rubble, selling of tanks and other metal materials as scrap; offsite disposal of concrete, asphalt, and other materials; and treatment of generated decontamination fluids, as appropriate. The estimated capital cost for this remedial action is $4,050,000. No O&M will be incurred.

PERFORMANCE STANDARDS OR GOALS: Tanks, piping, processing equipment and building materials designated for salvage or reuse will be decontaminated to a level not to exceed 100 ug/100 cm^2 PCBs on the surface, as determined by wipe sampling. Concrete, asphalt, other materials containing PCBs, and any others which cannot be decontaminated to less than 50 mg/kg PCBs, will be disposed of at an offsite hazardous waste landfill. This operable unit remedy does not attempt to ensure compliance with all ARARs for the entire site, but will not be inconsistent with a final comprehensive remedy for the site.

INSTITUTIONAL CONTROLS: Not applicable.

DRAKE CHEMICAL, PA
Third Remedial Action - Final
September 29, 1988

ROD ABSTRACT

The Drake Chemical Site is a 12.5-acre inactive chemical manufacturing facility located in Lock Haven, Clinton County, Pennsylvania. The area surrounding the site includes American Color and Chemical Company to the west, Hammermill Paper Company to the southwest, Bald Eagle Creek to the south, the west branch of the Susquehanna River to the north, and an apartment complex and a shopping center to the east. Bald Eagle Creek and the Susquehanna River are wetland areas and are used for recreation and fishing. Lock Haven residents do not use ground water for drinking purposes. The facility operated between 1951 and 1982 manufacturing chemical intermediates used in producing dyes, cosmetics, textiles, pharmaceuticals, and pesticides. The site includes two synthetic-lined wastewater treatment lagoons, an unlined leachate lagoon, and a dry unlined sludge lagoon. The water and sediments within the two lined impoundments are highly contaminated with site-related organic and inorganic contaminants. The site surface is covered with debris, chemical sludge, and contaminated soil. Approximately 252,000 yd^3 of soil, sludges, and sediments are contaminated. The Drake Chemical Company was cited several times by State and Federal agencies for violating environmental and health and safety regulations. In 1982, EPA began an emergency removal action in which surface drums, surface sludges, and liquids contained in process and storage tanks were removed and disposed of, and the site was fenced. A ROD signed in 1982 addressed the leachate stream that ran offsite towards Bald Eagle Creek, and remediation was completed in 1987. A subsequent ROD signed in May 1986 required demolition of onsite contaminated buildings and tanks, and disposal in an offsite landfill. This work currently is being undertaken. The focus of the remedial action addressed in this ROD is remediation of the contaminated soil, sludges, and ground water at the site. The primary contaminants of concern affecting the ground water, surface water, soil, and sediments are VOCs including benzene, toluene, TCE, and xylenes, other organics including fenac, phenols, and PAHs, and metals including lead, chromium, and arsenic.

The selected remedial action for this site includes: excavation of approximately 252,000 yd^3 of contaminated sludge, soil, and sediments, followed by treatment in an onsite mobile rotary kiln incinerator, backfilling (possibly using the incinerator ash as backfill material) and installation of a vegetative cover; design and construction of an onsite wastewater biological activated carbon treatment plant with pump and treatment of the surface water, ground water, storm water, and aqueous wastes from the leachate lagoon at the treatment plant, followed by discharge to a local stream or POTW; and ground water monitoring. The estimated present worth cost for this remedial action is $97,363,000 with an average annual O&M of $787,000.

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup goals will attain an overall risk level of 10^{-5} by treatment of the ground water to MCLs or MCLGs. Discharge level of treated water will meet local POTW and NPDES requirements. Individual contaminant goals were not specified.

INSTITUTIONAL CONTROLS: Not applicable.

FIKE CHEMICAL, WV
First Remedial Action
September 29, 1988

ROD ABSTRACT

The Fike Chemical site is an approximately 11-acre site located in the Nitro Industrial Complex, Nitro, West Virginia, on the flood plain of the Kanawha River, which is 2,200 feet to the west. The population within a 10-mile radius of the site is estimated to be 25,000. The site consists of the Fike operations property and the Cooperative Sewage Treatment, Inc. (CST) property, which is a joint venture between Fike (now Artel Chemicals, Inc.) and Coastal Tank Lines, Inc. The Fike plant property was an active chemical manufacturing plant from 1968 to June 1988. During Fike's operation, over 60 different chemicals were produced, all by batch reaction on an as-needed basis. Other site activities leading to contamination include onsite disposal of hazardous wastes through drum burial and unlined surface lagoons, and tank storage of various chemical stock, products, and wastes. The CST property, which is adjacent to the Fike property to the northwest, consists of a series of basins, treatment tanks, and sludge drying beds, which are designed to treat plant surface runoff and process wastewater delivered from Fike Chemical via separate sewer systems. The treated water is discharged into the Kanawha River. The CST property has a long history of enforcement activity resulting from violations of their NPDES permit and various noncompliance issues under RCRA, leading to termination of interim status in November 1985. Approximately 300 bulk storage tanks are located onsite, containing acids, bases, flammables, and cyanides. A minimum of 2,000 surface drums are onsite in uncontrolled storage facilities. Approximately 8,000 laboratory containers of known and unknown contents are at the site. Wastes buried onsite include 1,000 drums and an undetermined number of additional laboratory containers. Approximately 100,000 pounds of metallic sodium is contained in 300 of the drums onsite. A pressurized tank of methyl mercaptan contains approximately 9,000 gallons. This remedial action will reduce the imminent hazards currently present onsite. Contaminated soil and ground water will be addressed in a subsequent remedial action. The primary contaminants of concern affecting the soil, ground water, and surface water are organics including PCBs and methyl mercaptan, inorganics including cyanide, asbestos, and acids, and metals.

The selected remedial action for this site includes: removal and offsite treatment through incineration and offsite disposal of the tank containing methyl mercaptan; offsite treatment and disposal of drums of metallic sodium; removal, bulking, and offsite treatment and disposal of drums on the ground surface and of the materials found in various tanks, lines, and vessels (through incineration, offsite ion exchange, or chemical oxidation and stabilization or fixation, depending on drum/tank contents); lab-packing and offsite disposal of laboratory containers or treatment through offsite incineration; drainage and stabilization of lagoons and treatment of the drained liquids with discharge of treated liquids to Kanawha River; excavation, bulking, storage, and offsite disposal of buried drums; stabilization and/or removal and disposal of asbestos-containing insulation materials found in process lines; and removal and disposal of cyanides. The estimated present worth cost for this remedial action is $8,000,000 with no associated O&M costs.

PERFORMANCE STANDARDS OR GOALS: This remedial action is designed to reduce or eliminate the most threatening hazards to human health and the environment. The ROD individual goals were not specified. Lagoon liquids will be treated and disposed of in accordance with the NPDES permit issued by the State.

INSTITUTIONAL CONTROLS: Not applicable.

HENDERSON ROAD, PA
First Remedial Action
March 30, 1988

ROD ABSTRACT

The Henderson Road site is an active waste facility situated on 7.6 acres of land in Upper Merion Township, Pennsylvania. The land in the vicinity of the site is zoned for light industrial, heavy industrial, and residential use. The site is approximately 2,000 feet south and upgradient of the Upper Merion Reservoir (UMR), where ground water is part of a public water supply serving 228,000 customers. A water supply well 350 feet southeast and upgradient of the site serves 15 employees of a lumber company. The site area is also characterized by sinkholes resulting from dissolution and subsequent collapse of the dolomite and limestone bedrock. The O'Hara Sanitation Company (OSL) presently occupies the site with several automobile repair shops and a drilling contractor. The OSL presently conducts onsite waste storage and waste recycling operations. An anonymous phone call to the Pennsylvania Department of Environmental Resources (PADER) in 1977 stated that ABM Disposal Service Company transported and then injected industrial waste into a well located inside the OSL maintenance garage. Limited information is available on the types or volumes of materials disposed of before PADER was notified of injection activities at the site. Results of PADER and EPA sampling conducted between 1977 and 1981, and ground water monitoring conducted in 1986 revealed the presence of organic and VOC contamination both on and offsite. Of the 35 chemicals of concern identified at the site, fifteen were found in UMR in 1986. Certain site-related chemicals also have been detected between the site, UMR, and the adjacent water supply well. Additionally, the site is located in an area of regional ground water contamination. Studies also indicate that the central plume of contamination from the site has not yet reached the UMR, based on an estimated travel time for ground water from the site to reach UMR. However, onsite ground water is still highly contaminated and the extent of contamination in the rocks and fractures in the unsaturated bedrock has not been fully characterized. A potential might exist for increased offsite loading to the ground water. The primary contaminants of concern include VOCs and organics.

The selected remedial action for this site includes: installation of onsite and downgradient (if necessary) ground water recovery wells and treatment using air stripping with probable discharge to an adjacent stream and possible discharge of a portion of the treated ground water onto an area near the injection well as part of the unsaturated zone treatment (soil flushing); closure of the injection well; excavation of contaminated oil pit sediments and removal of significant waste, if feasible, directly out of the injection well; installation, operation, and maintenance of a carbon adsorption water treatment system at an affected offsite active well; deed restrictions affecting ground water usage; ground water monitoring; collection and evaluation of data during RD/RA phase for possible pilot testing of in-situ volatilization (ISV) of VOCs or another appropriate treatment technology in the unsaturated zone; and periodic reevaluation of cleanup goals. The estimated present worth cost for this remedial action ranges from $5,500,000 (without ISV, unsaturated zone treatment, or downgradient pump and treatment) and $12,200,000 (with ISV).

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup will attain a 7×10^{-4} cancer risk level. Complete aquifer restoration is not considered feasible because of background contamination. Should background contamination increase or decrease, the risk level will also change. Individual cleanup goals were provided for 46 chemicals. Some goals include: PCE 6.9 ug/l (derived from EPA Superfund Public Health Evaluation Manual), TCE 25.8 ug/l (ACL based on background levels), toluene 2,000 ug/l (MCLG), benzene 5.52 ug/l (ACL based on background levels), chromium 50.0 ug/l (MCL), and lead 20.0 ug/l (MCLG).

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to limit or prohibit ground water usage on properties affected by the injection well.

KIMBERTON, PA
First Remedial Action
September 30, 1988

ROD ABSTRACT

The Kimberton site is located in the northeastern portion of Chester County, Pennsylvania, near the Philadelphia metropolitan area. The site encompasses the Monsey Products Company property and adjacent properties within the surrounding Village of Kimberton. Several buried lagoons are located on the site. The lagoons are in close proximity to numerous private water supply wells and less than one mile from French Creek, which is used for public recreation and fishing. The site had two successive owners before Monsey Products purchased it in 1968. All owners were involved in industrial production. One owner, Ciba Products Company, a predecessor of CIBA-GEIGY, operated eight lagoons at the site during its period of ownership from 1947 to 1959. The lagoons received various residues from the manufacturing operations at the time. In August 1981, VOCs were first detected during routine water quality testing of a private well on Monsey property. EPA's subsequent investigation in early 1982 indicated that soil, ground water, and surface water were contaminated by VOCs including DCE, TCE, and vinyl chloride. The lagoons were identified as a source of contamination, and subsequently, approximately 2,050 yd^3 of contaminated soil from three former lagoon areas were excavated and disposed of offsite in September 1984 as part of a site remedial action plan. The excavations were backfilled, regraded, and revegetated. Furthermore, in December 1986, CIBA-GEIGY and Monsey Products provided 25 residential and commerical locations with an alternate source of drinking and contact water. Currently, sampling and analysis has or currently is being performed in other lagoon areas to evaluate their potential as sources of ground water contamination. This remedial action was designed to address the health risk to those residents who may continue to use contaminated private wells. A subsequent ROD will address other sources of contamination as well as additional ground water remediation. The primary contaminants of concern affecting the ground water are VOCs including DCE, TCE, and vinyl chloride.

The selected remedial action for this site includes: continued provision of an alternate water supply -- either by treating impacted residential and commerical wells by filtration using granular activated carbon adsorption or by providing below-grade storage tanks for all water needs (contact and drinking use); and continued monitoring of impacted wells. The estimated present worth cost for this remedial action is $3,850,000 with estimated annual O&M costs of $250,000 to $300,000.

PERFORMANCE STANDARDS OR GOALS: Ground water treatment will attain a 10^{-6} risk level for VOCs. The use of granular activated carbon filters in impacted offsite wells has reduced the contaminants of concern to non-detectable levels.

INSTITUTIONAL CONTROLS: Not applicable.

L.A. CLARKE & SON, VA
First Remedial Action
March 31, 1988

ROD ABSTRACT

The 40-acre L.A. Clarke site is located in Spotsylvania County, Virginia. Wood preserving operations began at L.A. Clarke & Son, Inc. in June 1937 and have continued to date with only one inactive period, from April 1979 to June 1980. During the past 50 years, creosote contaminated soil and sediments resulted from facility operations spills, waste streams entering the drainage ditches, and onsite disposal. Historical aerial photography indicates that from at least 1953 through 1974 wastewater was disposed into two concrete-lined pits. An area located north of the process facility also received wastes. Overflow from the concrete pits was stored in an earthen pit. Excess water was discharged to drainage ditches and sprayed on the ground around the storage yard to control dust. Aerial photography identified four additional waste water pits which date back to 1937. These four pits were filled in by 1979. In 1975, L.A. Clarke & Son, Inc. was issued a National Pollution Discharge Elimination System (NPDES) permit for outfalls from two onsite drainage ditches. These permits are still in effect. Phenol is the only toxic contaminant regulated by the permit. In 1980, L.A. Clarke & Son, Inc. was classified under RCRA as a treater of hazardous waste due to the presence of a wastewater impoundment lagoon. As part of a State-mandated remedial action in 1982, approximately 1,400 yd^3 of soil was excavated from the processing area to create a RCRA-regulated soil waste pile. The primary contaminants of concern affecting both the soil and sediments (total volume of 119,00 yd^3) are constituents of creosote including PNAs and benzene.

The selected remedial action for this site includes: in-situ soil flushing of subsurface soil underlying the process buildings followed by in-situ biodegradation in the creosote layer area; biological degradation of bottom sediments in the lagoon; onsite landfarming of excavated surface soil, sediments, and subsurface wetland soil; excavation, dredging, and onsite consolidation of contaminated sediments, subsurface wetland soil, buried pit materials, and surface soil not remediated via in-situ flushing; erosion/sedimentation control; backfilling excavated areas with treated soil and sediment; and ground water monitoring. The estimated capital cost for this remedial action is $21,080,000 with present worth O&M of $33,900. Should it be determined that the onsite process building requires removal, landfarming/biodegradation may be implemented at an added capital cost of $910,900.

PERFORMANCE STANDARDS OR GOALS: To achieve protection of the shallow aquifer for drinking water purposes, target cleanup levels for subsurface soil include PNAs 10.3 mg/kg and benzene 94.03 mg/kg. These levels correspond to a 10^{-6} site risk level and a 10^{-5} risk at the site boundary. These levels also will protect aquatic life in surface water.

INSTITUTIONAL CONTROLS: Insititutional controls necessary to maintain the site will be developed after completion of the remedial action.

MIDDLETOWN AIR FIELD, PA

First Operable Unit
December 31, 1987

ROD ABSTRACT

The Middletown Air Field site covers what is now the Harrisburg International Airport (HIA), located between the town of Middletown and Nighspire, Dauphin County, Pennsylvania. The airport is owned and operated by the Commonwealth of Pennsylvania Department of Transportation. The area surrounding the base is characterized as mixed residential/industrial. Between 1898 and 1962, the property was owned by the U.S. Government and used by the military. HIA and several other entities occupy what was referred to as the Olmsted Air Force Base. In March 1983, TCA contamination caused six of the ten onsite production wells supplying HIA to be taken out of service. Studies initiated under the Department of Defense Installation Restoration Program indicate that while ground water contamination due to volatile organic compounds exists, the exact source(s) of contamination cannot be clearly defined. Ground water contamination may result from one or more, possibly current, sources in the "industrial area". To date, HIA has been able to temporarily meet the water requirements of the facility by taking the most contaminated well off-line as a potable water source, and by blending potable water from a number of wells. The most prevalent contaminants of concern affecting the ground water are VOCs including TCE and PCE.

The selected remedial action for this site includes: provision of a potable water supply; construction of a central treatment plant; ground water pump and treatment using air stripping; and ground water monitoring. The estimated capital cost for this remedial action is $3,750,000 with annual O&M of $160,000.

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup levels will meet a cumulative 10^{-6} cancer risk level for PCE 1.0 ug/l, and MCLs for TCE 5.0 ug/l and benzene 5.0 ug/l. An MCLG was established for toluene 2,000 ug/l.

INSTITUTIONAL CONTROLS: Not applicable.

NEW CASTLE STEEL, DE
First Remedial Action - Final
March 31, 1988

ROD ABSTRACT

The New Castle Steel site (NCS) is a 3-acre disposal dump, located in New Castle, Delaware. The site is divided into two parts by a city drainage channel. One portion of the site, the inactive disposal area, occupies 1.3 acres, and the active area occupies 1.7 acres. Since operations began in 1907, solid waste generated by the Deemer Steel Company (DSC), located immediately across the NCS site, was piled and periodically spread over the surface of the disposal areas. The waste consisted primarily of black sand which may contain small quantities of bentonite and corn flour. Approximately, 1,800 yd^3 (2,430) tons of black sand were generated each year. Other waste materials were sent to the disposal areas and mixed with black sand. These materials included: slag, coke, iron oxide, fine sand dust, and metal scrap. Between 1973 and 1980, electric furnace dust was generated at the rate of 9.6 tons per year. This dust was mixed with black sand and spread over the active waste area. The adoption of the Delaware Regulations governing hazardous waste in November 1980 identified the electric furnace dust and any mixture of this material with solid waste as a RCRA listed hazardous waste (waste number K061). EPA subsequently changed the definition of K061, and none of the waste from DSC operations would qualify as a listed hazardous waste. In December 1980, the electric furnace dust was found to be EP-toxic for cadmium, chromium, and lead. A June 1984 hydrogeological study reported the thickness of wastes in the fill section ranged from 8 to 13 feet, and the average thickness was approximately 10 feet. Wastes were placed over predominantly unconsolidated marsh sediments, which are underlain by approximately 50 feet of low-permeability clays. The uppermost Potomac aquifer, an important drinking water source, lies about 70 feet below the site, and is protected by the low-permeability clays. An Endangerment Assessment (EA) was prepared based on the data collected from the samples in January 1987. The EPA concluded that no significant risk to human health and the environment could be attributed to the site. Contaminant screening identified five indicator chemicals. They include: arsenic, cadmium, chromium, lead, and nickel.

The selected remedial action for this site is no further action. EPA will monitor surface wastes for lead until the site is deleted from the National Priorities List (NPL) and closed under the State closure law. There is no capital cost or O&M associated with this remedial action.

PERFORMANCE STANDARDS OR GOALS: Concentrations in ground water of lead, cadmium and chromium are below the levels established as MCLs under the Safe Drinking Water Act. Lead detected in surface water has exceeded Ambient Water Quality Criteria and may be adversely impacting a localized wetlands area. There is no evidence to link the levels of lead in the wetlands to the site. The higher levels can be partially attributed to the urban environment and tidal influx from the river.

INSTITUTIONAL CONTROLS: Not applicable.

ORDNANCE WORKS DISPOSAL, WV
First Remedial Action
March 31, 1988

ROD ABSTRACT

The Ordnance Works Disposal site, also known as the Morgantown Ordnance Works, is located one mile south of Morgantown, West Virginia. The Monongahela River is adjacent to the site with a fairly steep cliff separating the river from portions of the site. Remediation for this first operable unit focuses on the waste disposal area which consists of an inactive landfill, two former lagoons, and the surrounding impacted area, and a scraped area of bare soil. These areas are located within an industrial tract of over 800 acres of which 670 acres are owned by Morgantown Industrial Park Association, a group of private individuals who joined together to purchase the Ordnance Works property in 1982. Prior to this, the site was owned by numerous companies and used for a variety of chemical production operations. The landfill covers a surface area of approximately 1.6 acres. The landfill was reportedly used from 1942 until 1962, for the disposal of various solid chemical wastes. Waste materials identified included: construction debris, slag, ash, and catalyst pillets. Arsenic and carcinogenic PAHs (CPAHs) were detected in the soils at concentrations exceeding risk-based cleanup levels. The former lagoon and the surrounding area, located adjacent to the landfill, cover a surface area of 3 to 4 acres. This area is relatively flat with a cinder-like surface layer and sparse vegetation. Metal plating wastes were placed in the lagoon between 1970 and 1976. The lagoons were excavated in 1981 by the responsible party, and the contents were disposed of offsite. The metals present in the soil are currently below the recommended cleanup levels. CPAHs have been identified at levels exceeding cleanup standards in the area adjacent to the lagoons. An oily, stained cinder material was observed in areas where CPAHs were detected. The scraped area, carving a surface area of approximately 162 acres, was an active disposal area for solid wastes from 1942 until 1962. The waste materials identified include: construction debris, oil-like stained soils, and catalyst pillets. Currently, arsenic and CPAHs exceed the proposed cleanup levels. The primary contaminants of concern affecting the soil and sediments include arsenic and CPAHs.

The selected remedial action for this site includes: consolidation of existing landfill waste and application of a multi-layer RCRA cap; excavation and onsite incineration of former lagoons and surrounding area, scraped area soil, and impacted stream sediments with onsite disposal of treatment residuals in the landfill prior to the installation of the cap (assuming the ash is not EP toxic); placement of clean fill in the excavated area, followed by grading and revegetation; implementation of surface management techniques for drainage and sediment control in the landfill area; ambient air monitoring; and post-treatment monitoring. The estimated present worth cost for this remedial action is $6,718,000.

PERFORMANCE STANDARDS OR GOALS: Risk-based cleanup levels for indicator chemicals were developed for arsenic 20 mg/kg, CPAHs 26 mg/kg and mercury 175 mg/kg. A PCB cleanup level of 5 mg/kg was used based on EPA cleanup goals for industrial sites.

INSTITUTIONAL CONTROLS: Land use restrictions that prohibit intrusive activities in capped areas would apply to future site use.

PALMERTON ZINC, PA
Second Remedial Action
June 29, 1988

ROD ABSTRACT

The Palmerton Zinc site is composed of two locations in the Borough of Palmerton, Carbon County, Pennsylvania. Smelting operations have been conducted at two locations, a west smelter and an east smelter, flanking the Town of Palmerton, which is located at the confluence of the Lehigh River and Aquashicola Creek. Approximately 7,000 residents live in Palmerton, many of whom work at the smelting facility. Land use in the area is industrial, residential, and agricultural. The drainage pattern in the site area is toward Aquashicola Creek, designated a warm water fishery by the State of Pennsylvania, which flows into Lehigh River. Smelting operations were conducted in the west plant from 1898 to 1987, and in the east plant from 1911 to present. The site has had three owners, including the current operator, Zinc Corporation of America, and historically has produced zinc and other metals for a variety of products. Primary smelting of concentrated zinc sulfide ores, conducted until December 1980, resulted in the emission of large quantities of zinc, lead, cadmium, and sulfur dioxide. This air pollution caused defoliation of over 2,000 acres of vegetation in the vicinity of the east smelter. Between 1898 and 1987 process residue and other plant wastes (as well as municipal waste until 1970) were disposed of on Cinder Bank, a 2.5-mile, 2,000-acre waste pile located behind the east plant at the base of the Blue Mountains. Cinder Bank contains approximately 27.5 million tons of leachable metals including lead, zinc, and cadmium, as well as carbonaceous material. Large blocks of residue crack and break off, allowing rapid infiltration of runoff during periods of rain and snow melt, resulting in contaminated leachate percolating down to the ground water and seeping out of Cinder Bank. This remedial action addresses Cinder Bank. Additional areas of contamination as well as ground water and surface water contamination will be addressed in subsequent remedial actions. The primary contaminants of concern affecting the sediments, ground water and surface water are metals including cadmium, lead, and zinc.

The selected remedial action for this site includes: slope modification, capping and application of a vegetative cover on Cinder Bank; construction of surface water diversion channels; surface water and leachate collection and treatment using lime-activated filtration lagoons and/or constructed wetlands; implementation of an inspection, monitoring, and maintenance plan; and wetlands restoration measures, if necessary. The estimated present worth cost for this remedial action will be in excess of $2,861,800; however, the exact figure will not be known until agreement is reached on the extent of remediation during remedial design.

PERFORMANCE STANDARDS OR GOALS: Surface water and leachate treatment levels will meet Clean Water Act requirements and attain surface water background levels. Individual cleanup goals were not specified.

INSTITUTIONAL CONTROLS: Not applicable.

RHINEHART TIRE FIRE, VA
First Remedial Action
June 30, 1988

ROD ABSTRACT

The Rhinehart Tire Fire (RTF) site is located in a sparsely populated rural area in Western Frederick County, Virginia, approximately six miles east of the Town of Winchester. Between 1972 and 1983, the site owner, Mr. Rhinehart, conducted a tire disposal operation which consisted of transporting discarded tires from various locations and storing them on a wooded slope behind his home. By October 1983, an estimated five to seven million tires had accumulated and on October 31, 1983, caught fire. A hot oil produced from melting and pyrolysis of the tires seeped from the pile of tires into Massey Run. An undetermined quantity of oil flowed into Hoque Creek, which is a tributary to the Potomac River system. EPA's Emergency Response Team (ERT) installed a catch basin to trap the oil; however, because the high rate of oil and water seepage threatened to exceed the catch basin storage capacity, a lined 50,000-gallon pond was constructed immediately downslope from the burn area. Approximately 800,000 gallons of oil product was collected, removed from the site, and recycled into fuel oils. Soon after the fire, diversion structures were built by the owner of the site under a consent order agreement with EPA. EPA, through the Army Corps of Engineers, conducted a Remedial Investigation (RI) to characterize and define the extent of possible contaminants. The RI indicated that the precipitation falling on the ash-contaminated area continues to mix with both the solid residue and the liquid seepage. This remedial action will address the control of contaminated migration off-site via surface water runoff. A subsequent remedial action will address source control at the site. The primary contaminants of concern affecting the ground water, soil, and surface water are metals including arsenic and lead.

The selected remedial action for this site includes: collection of surface water runoff with gravity settling; collection of shallow ground water oily seeps, oil-water separation, and transport of water to a POTW; construction of berms to increase freeboard on two existing on-site ponds; and implementation of soil erosion controls. The estimated present worth cost for this remedial action is $1,332,340 with O&M costs of $145,000.

PERFORMANCE STANDARDS OR GOALS: The selected remedial action will minimize the amount of offsite contamination migration. Individual containment goals were not specified.

INSTITUTIONAL CONTROLS: Not applicable.

SOUTHERN MARYLAND WOOD, MD
First Remedial Action - FINAL
June 29, 1988

ROD ABSTRACT

The Southern Maryland Wood Treating (SMWT) site is located in Hollywood, St. Mary's County, Maryland. The site is situated within a wetland area in a drainage divide such that runoff from the site discharges into Brooks Run and McIntosh Run tributaries, which flow into the Potomac River. The area surrounding the site is predominantly used for agricultural and residential purposes. From 1965 to 1975, SMWT operated as a pressure treatment facility for wood preservation. Currently, part of the site is being used as a retail outlet for pretreated lumber and crab traps. The waste generated at the site included retort and cylinder sludges, process wastes, and material spillage. These wastes were in six onsite unlined lagoons. An onsite freshwater pond became contaminated during the facilities active and inactive periods with VOCs, polynuclear aromatics (PNAs), and base/neutral extractables due to contaminated ground water and surface runoff. Cleanup actions were initiated in 1982 following legal actions by the Maryland Department of Health and Mental Hygiene. Liquids removed from the six lagoons were spray irrigated onto the nearby woods. The six lagoons were excavated, backfilled, and graded, and the freshwater pond was partially excavated. The excavated sludges were mixed with composited sludge and topsoil, and spread in a level treatment area located on the property. The primary contaminants of concern affecting the onsite ground water, soil, surface water, sediments, and debris include: VOCs, PNA, and base/neutral acid extractables.

The selected remedial action for this site includes: excavation/dredging of soils, sediments, tank liquids and cement and treatment using onsite incineration with onsite disposal of non-hazardous residual ash, backfilling, regrading, and revegetating, where necessary; installation of a slurry wall; dewatering of the slurry wall area by a ground water and surface water pumping system, and treatment using activated carbon adsorption or hydrogen peroxide and irradiation with discharge to the onsite pond; installation of a geotextile silt fence, sedimentation basins, and/or diversion; and ground water, surface water, environmental, organic vapor, and dust monitoring.

PERFORMANCE STANDARDS OR GOALS: All media will attain the cleanup goal for carcinogenic PNAs (CPNAs) of 22 ppm based on the maximum lifetime cancer risk. These goals were established for onsite future residents. The ash residue is expected to meet Best Demonstrated Available Technology (BDAT).

INSTITUTIONAL CONTROLS: Not applicable.

TYSON'S DUMP, PA
First Remedial Action
March 31, 1988

ROD ABSTRACT

Tyson's Dump, a four-acre abandoned septic and chemical waste disposal site, is located in Upper Merion Township, Montgomery County, Pennsylvania. Several formerly unlined lagoons were used to store various industrial, municipal, and chemical wastes. Spills and overflows reportedly occurred during the period of operation, thus allowing for the dispersal of wastes throughout the site. Surface water runoff and seeps contributed to offsite migration of the wastes toward the Schuylkill River. The site is bordered on two sides by unnamed tributaries to the river. When the Pennsylvania Department of Environmental Resources (PADER) ordered two dumps closed in 1973, the owner of the land, General Devices Inc., removed some ponded water but did not arrange for the removal of contaminated soils. Immediate removal measures were initiated in January 1983, following an anonymous citizen complaint about conditions at the site. These measures included: construction of a leachate collection and treatment system, installation of drainage controls and a site cover, and fencing of the lagoon area. In December 1984, EPA issued an operable unit ROD for the onsite area. Remedial actions selected in the ROD include excavation and offsite disposal of contaminated soils and sediments and upgrading the existing air strips to treat leachate, shallow ground water and surface run-on. EPA began the remedial design phase for this selected alternative in January 1985. In the fall of 1985, Ciba-Geigy Corporation (CGC) agreed to conduct a further investigation of the offsite area. In November 1986, CGC initiated an onsite pilot study using an innovative vacuum extraction technology process. In June and July 1987, four responsible parties, CGC, Smith-Kline Beckman, Wyeth Laboratories and Essex Group submitted an alternative proposal to EPA for the first operable unit cleanup. This proposal incorporated the results of the vacuum extraction process for remediating lagoon soils. In September 1987, after close review of the technology, EPA decided to recommend a ROD change to include vacuum extraction. This new alternative was not available when the original Feasibility Study was conducted prior to the 1984 ROD. In addition, CGC's investigation discovered that most of the contamination from the lagoon areas had migrated into the bedrock and excavation would not remove all the contaminants from the area underlying the site. The primary contaminants of concern are VOCs. The four indicator compounds include benzene, trichloroethene, tetrachloroethene, and 1,2,3-trichloropropane.

The amended remedial action for this site includes: in-situ treatment of soils and bedrock using vacuum extraction; treatment of the vacuum-extracted water using the onsite leachate water treatment system; installation of a soil cover following treatment; and ground water monitoring. The estimated present worth cost for this remedial action is $10,200,000.

PERFORMANCE STANDARDS OR GOALS: Vacuum extraction will cleanup a 20 to 40 foot radius. Cleanup levels were developed using health-based acceptable intake levels and hypothetical exposure scenarios. The scenario producing the most stringent cleanup requirements was selected as the cleanup goal. Individual cleanup goals were listed for 45 contaminants. Cleanup levels for indicator compounds include: benzene 50 ug/kg, trichloroethene 50 ug/kg, tetrachloroethene 50 ug/kg, and 1,2,3-trichloropropane 50 ug/kg.

INSTITUTIONAL CONTROLS: Not specified.

VOORTMAN FARM, PA
First Remedial Action - Final
June 30, 1988

ROD ABSTRACT

The 43-acre Voortman Farm site is located in Upper Salucon Township, Lehigh County, Pennsylvania. The site consists of a sinkhole that contained empty battery casings disposed of in late 1979 and early 1980. Citizen complaints in 1980 prompted the prohibition of dumping and subsequent site investigation. In September 1986, the battery casings in the sinkhole caught on fire. Since the battery casings were burning underground, attempts to extinguish the fire remained unsuccessful. In October 1986, access was gained to the burning wastes, which were then excavated and extinguished. Additional wastes and residues were excavated from the sink hole and disposed of offsite. The collapse of the sinkhole walls has formed a natural cap. There does not appear to be any leaching from any residual metals, contaminated soils, or battery casings present.

The selected remedial action for this site is a no further action with continued ground water monitoring for five years. The estimated present worth cost for this remedial action is $26,000 with annual O&M of $6,860.

PERFORMANCE STANDARDS OR GOALS: Currently, the ground water does not violate drinking water standards. No location-specific or action-specific ARARs are applicable to this alternative.

INSTITUTIONAL CONTROLS: Not applicable.

WEST VIRGINIA ORDNANCE, WV
Second Remedial Action - Final
September 30, 1988

ROD ABSTRACT

The West Virginia Ordnance (WVO) site covers approximately 8,323 acres in Mason County, West Virginia. It is located on the east bank of the Ohio River. Almost one-third of the site is occupied by a 2,788-acre wildlife station containing more than 30 shallow ponds created to promote a wetland/terrestrial habitat for various wildlife species. Established in 1942, the WVO plant manufactured explosives, specifically TNT, from toluene. General Chemical Defense Corporation of New York operated the plant until 1945. Red and yellow water (liquid wastes) were produced during the TNT manufacturing process. Yellow water was discharged to the Mill Creek drainage system, which eventually drains into the Ohio River; red water was discharged directly to the Ohio River through a pipe located about one foot offshore. Retention ponds were constructed to regulate the discharge of red and yellow water to the river. TNT and associated by-products were buried onsite. In May 1981, ranger officials observed a seep of red water adjacent to a pond located on the wildlife station. Upon examination, ground water discharging to this pond was found to be contaminated by di- and trinitrotoluenes and phenol. Localized contamination of the shallow ground water and discharge to surface water have been documented in the vicinity of the TNT manufacturing area, the burning grounds, sediments of surface water receiving contamination, and former wastewater storage lagoons. Evidence also indicates that soils of the industrial area, process facilities, and industrial wastewater facilities are contaminated by TNT and associated by-products (nitroaromatics). Based on the hydrogeologic setting of WVO, there is potential for contamination to migrate via surface water and/or ground water pathways to deeper layers of an underlying potable aquifer, or to the Ohio River. Contaminant migration is possible toward the City of Point Pleasant and Camp Conlay community potable water supplies. The primary contaminants of concern affecting the soil, sediments, and ground water are nitroaromatics and lead.

The selected remedial action for this site addresses three distinct areas of contamination. These remedies include: Area 1 - purchase of contaminated land and control of land use, placing a soil cover over the contaminated area, and incorporating the area into the existing wildlife preserve; ground water pump and treatment to nitroaromatics criteria with discharge to surface water; monitoring discharge from the ground water treatment system to ensure compliance with the stream standards; and periodically inspecting and maintaining the soil cover in a stable condition. Area 2 - relocating ponds 1 and 2, filling them with clean material and covering them with a soil and clay cap; ground water pump and treatment to nitroaromatics criteria with discharge to surface water; and monitoring effluent from the treatment system to ensure compliance with surface water criteria. Area 3 - installing a soil cover over the West Well Area and the seep area; ground water pump and treatment to nitroaromatics criteria with discharge to surface water; monitoring effluent from the treatment system to ensure compliance with surface water criteria; and periodically inspecting and maintaining the soil cover in a stable condition. The estimated present worth for this remedial action is $3,365,000, with estimated O&M cost of $216,500.

PERFORMANCE STANDARDS OR GOALS: West Virginia ground water protection standards permit ACLs if these levels will not pose a substantial present or potential hazard to health or the environment. Ground water cleanup levels were based on available chemical-specific standards, or a 10^{-6} cancer risk. Concentration limits for treated ground water in Areas 1 and 2 include: TNT 50 ug/l, dinitrobenzene 14 ug/l, trinitrobenzene 200 ug/l, 2,4-DNT 0.11 ug/l, and 2,6-DNT 0.022 ug/l. The criteria for Area 3 ground water include: TNT 4.6 mg/l; dinitrobenzene 12 mg/l; trinitrobenzene 6.2 mg/l; 2,4-DNT 0.26 mg/l, and 2,6-DNT 0.052 mg/l.

INSTITUTIONAL CONTROLS: The purchase of Area 1 and incorporating it as part of the wildlife preserve will prohibit development of the lands for residential or industrial use.

WESTLINE, PA
Second Remedial Action
June 29, 1988

ROD ABSTRACT

The Westline site, located in the town of Westline, McKean County, Pennsylvania, is a 40-acre tract of land formerly used as a lumber processing facility. Between 1901 and 1952, the onsite chemical plant converted lumber into charcoal, methanol, and acetic acid. In 1952, the plant was closed due to equipment deterioration and declining profits. Waste tars containing high levels of polynuclear aromatic hydrocarbons (PAHs) and various phenolic compounds were left onsite. An Emergency Removal Action was implemented in 1983 to remove the largest tar deposit, and a Record of Decision was signed in July, 1986 to address the excavation and offsite incineration of remaining tar deposits and contaminated soil. This second operable unit addresses potential ground water contamination. In 1985 high levels of benzene were found in two onsite monitoring wells. Additional tests indicated the presence of toluene, trichloroethane, phenol, and other VOCs; however, benzene was the only contaminant that exceeded Federal Maximum Contaminant Levels (MCLs) of 5 ug/l, and is, therefore, the primary contaminant of concern.

The selected remedial action for the ground water operable unit at the Westline site is no further action. Since drinking water for the town of Westline is obtained from small streams upgradient of the site and all contaminants except benzene are below Federal MCLs, EPA has determined that no significant risk to public health and the environment exists. Ground water will be monitored to ensure effectiveness of natural attenuation, and institutional controls will be implemented to prevent construction of new drinking water wells in the contaminated area. There are no capital costs associated with the remedy, and O&M costs for monitoring were not specified.

PERFORMANCE STANDARDS OR GOALS: Natural attenuation can meet the MCL for benzene 5.0 ug/l within a 5 to 10 year period. The remedy meets the 8.93×10^{-5} increased cancer risk level. Additionally, Water Quality Criteria and standards have not been exceeded.

INSTITUTIONAL CONTROLS: Restrictions will be implemented to prevent drilling of drinking water wells onsite.

WILDCAT LANDFILL, DE
First Remedial Action
June 29, 1988

ROD ABSTRACT

The Wildcat Landfill site is located 2.5 miles southeast of Dover in Kent County, Delaware. The 44-acre site is bordered to the north and east by the St. Jones River and its associated wetlands, and to the south and west by residential and commercial development. A pond, created by construction of the landfill, is located directly adjacent to the site along the northwestern edge. The pond is the subject of a second operable unit for the site. Portions of the site lie within the 100-year floodplain of the St. Jones River. The site was operated as a permitted sanitary landfill between 1962 and 1973, accepting both municipal and industrial wastes. Industrial wastes suspected to have been disposed of include latex waste and paint sludges. Throughout its 11 years of operation, the facility routinely violated operating and other permits issued by regulating agencies. EPA began investigating the site in 1982. Typical wastes encountered at the site included municipal refuse latex in strips and sheets; scattered crushed, empty, or intact drums; and manufactured plastic items. Much of the waste is located on low-lying wetland sediments; however, the area to the southwest was excavated and backfilled with wastes. Consequently, in that area of the landfill, wastes are in direct contact with the surficial sand aquifer. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, other organics including PCBs, and metals including arsenic and lead.

The selected remedial action for this site includes: grading, installation of a soil cover, and revegetation of onsite direct contact risk areas; removal and offsite disposal of drums containing wastes by landfilling (if not hazardous) or incineration (if hazardous); replacement of two domestic wells adjacent to the site; institutional controls including well and land use restrictions; and groundwater monitoring. The estimated present worth cost for this remedial action is $5,400,000.

PERFORMANCE STANDARDS OR GOALS: The performance goal of this remedial action is to eliminate the existing direct contact risks posed by the landfill through institutional controls and to control contaminant migration. Individual contaminant goals are not applicable.

INSTITUTIONAL CONTROLS: Well restrictions on installation of all drinking water wells onsite and in adjacent offsite areas. Land use restrictions on any commercial or residential building onsite.

AIRCO, KY
First Remedial Action - Final
June 24, 1988

ROD ABSTRACT

The Airco site is a 2.7-acre industrial waste landfill located outside the zoned area of Calvert City, Marshall County, Kentucky. The site is situated on the eastern edge of a heavily industrialized area. It is bordered on the west by the B.F. Goodrich (BFG) NPL site, on the east by undeveloped land and a slough, on the north by the Tennessee River, and on the south by agricultural land and a State highway. (The Airco site and the BFG site were studied as one site for the RI/FS and their remediation will be combined since they are located adjacent to each other and share a somewhat common history of use.) Airco began disposing waste material from their Calvert City plant into the landfill in 1959. By 1971, 18,000 tons of caustics, acids, VOCs, zinc, and mercuric acetate and mercuric chloride reportedly were disposed at the site. The landfill was unregulated until 1968, when a Solid Waste Disposal Permit was applied for and granted by the Kentucky Department of Natural Resources and Environmental Protection. Airco's Calvert City plant was sold to Air Products and Chemicals, Inc. (APC), in 1971. APC also leased the landfill from Airco until 1980, during which time they disposed of approximately 14,000 tons of coal ash containing low level metal contaminants, as well as polyvinyl chloride solids, ferric hydroxide sludge, and construction waste at the site. The landfill was capped and closed in September 1981. The site was placed on the NPL in September 1984. The primary contaminants of concern affecting the soil, sediments, and ground water are VOCs including benzene, toluene and 1,2-dichlorethane, and other organics including PAHs and PCBs.

The selected remedial action for this site includes: excavation and consolidation of approximately 5,000 yd^3 of contaminated soil and sediments within the dikes and around the landfills from both the Airco and BFG sites, with onsite disposal in the former burn pit area at the BFG site followed by construction of an organic vapor recovery system and a RCRA cap over the burn pit; reconstruction of the dikes surrounding landfills for flood prevention; upgrading of the landfill caps and installation of a leachate extraction system with onsite treatment of the leachate and offsite discharge to the local river; pump and treatment at the BFG plant site of ground water using air stripping and biological treatment or activated carbon adsorption, and discharge to the local river; possible treatment of ground water with an oil/water separator if ground water contains significant oil, and temporary onsite storage of oil with transport offsite to an oil recycling facility; access restrictions; and institutional controls to prevent residential development. The estimated present worth cost for this remedial action (including all costs related to the BFG site), is $6,090,000 with present worth O&M estimated to be $3,130,000.

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup levels will attain specific ACLs for the selected indicator chemicals at the site and include EDC (8.5 mg/l), benzene (8.5 mg/l), and TCE (8.5 mg/l). Contaminated subsurface soil in the burn pit areas will attain an EDC level of 139 mg/kg, which is based on the allowable EDC ground water concentration.

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to prevent residential development and installation of drinking water supply wells.

ALPHA CHEMICAL, FL
First Remedial Action - Final
May 18, 1988

ROD ABSTRACT

The Alpha Chemical site, located in Kathleen, Florida, consists of over 32 acres that comprise the Alpha Resins Corporation (ARC), a facility of the Alpha Chemical Corporation. Surface water from the site drains into a swampy, low-lying wetland area. Karst topography is evidenced by sinkholes in the area. The facility has produced unsaturated polyester resin for fiberglass manufacturers since 1967. A waste stream, referred to as the "water of reaction", is produced as a by-product of polyester resin formation. This waste stream is composed primarily of water containing small amounts of organics. ARC obtained a State permit in 1967 to place this waste stream in two unlined surface impoundments. The permit allowed for the ponds to act as percolation basins, allowing for the natural biodegradation of the organics. The percolation ponds have not been used since 1976. At that time, a thermal oxidizer was installed to incinerate the waste stream rather than place it in the percolation ponds. After switching to incineration, Pond 4 dried up. It was then used for one year as a solid waste landfill by ARC and its employees. In 1977, the landfill was covered with two feet of native soil. In 1982, ARC contacted the Florida Department of Environmental Regulations (DER) to obtain a permit to line Pond 3 with concrete for caustic wash water disposal. As a condition of the permit, DER required ARC to install ground water monitoring wells. In April, 1983, a DER ground water assessment report indicated industrial impacts on the surficial aquifer. Further soil and ground water sampling investigation did not reveal a definable plume of contamination. Of the 23 organic constituents identified in the ground water, ethylbenzene was found to be the most frequently detected, having a high concentration of contamination.

The selected remedial action for this site includes placing a low permeable cap over the unlined pond area, and long-term ground water and surface water monitoring. The estimated capital cost for this remedial action is $142,400 with present worth O&M of $186,200.

PERFORMANCE STANDARDS OR GOALS: Recommended AWQC are met for all wells at the property line and immediately downgradient of all site areas except the unlined pond. Capping will manage the threat of future releases from the pond area and meet AWQC downgradient of the unlined pond for: ethylbenzene 1.4 mg/l and 1,2-dichloropropane 1.4 mg/l.

INSTITUTIONAL CONTROLS: Not applicable.

BROWN WOOD PRESERVING, FL
First Remedial Action - Final
April 8, 1988

ROD ABSTRACT

The 55-acre Brown Wood Preserving site is located approximately two miles west of the City of Live Oak, Suwanee County, Florida. The site is located in karst terrain in which sinkholes are a common geological feature. The areas surrounding the site are considered rural and light agricultural. There are four private wells located along the site periphery that obtain water from an aquifer 20 to 100 feet below the site. The public water supply wells for the City of Live Oak are located less than two miles away. The site contains a former wood preserving plant facility, which pressure-treated timber products with creosote and some pentachlorophenol (PCP) between 1948 and 1978. During this time, several different companies operated the facility. In addition, the facility was rebuilt following a fire in February 1974. Sludge and contaminated soils have been identified in the immediate vicinity of the plant site and an upgradient lagoon. This three-acre lagoon drains approximately 74-acres and contains water provided above approximately 3,000 yd^3 of creosote sludge and contaminated soil. In addition, small amounts of solidified creosote and PCP are contained in onsite storage tanks and retorts. In 1981, EPA was notified by one of the former facility owners that hazardous waste may have been handled at the site. In July 1982, the Florida Department of Environmental Regulation (FDER) inspected the site and detected a number of organic compounds. An action, completed in February 1988, resulted in the removal of approximately 200,000 gallons of lagoon water and 15,000 tons of contaminated lagoon sludge and soil. The primary contaminants of concern affecting the soil, sediments, sludge, and waste water are creosote constituents including PAHs.

The selected remedial action for this site includes: removal and treatment, if necessary, of lagoon water with discharge to a POTW; excavation, treatment, and offsite disposal of approximately 1,500 tons of the most severely contaminated soil and sludge; onsite biodegradation of approximately 10,000 tons of the remaining soils in a 14-acre treatment area constructed with a liner and an internal drainage and spray irrigation system; covering of the treatment area with clean fill after bioremediation; and ground water monitoring. The estimated present worth cost for this remedial action is $2,740,000.

PERFORMANCE STANDARDS OR GOALS: The soils will be treated to reduce the concentration of total carcinogenic indicator chemicals to 100 mg/kg throughout the volume of material treated. This level for total carcinogenic indicator chemicals corresponds to an approximate 1×10^{-6} soil ingestion risk level.

INSTITUTIONAL CONTROLS: Not applicable.

CELANESE FIBERS OPERATIONS, NC
First Remedial Action
March 23, 1988

ROD ABSTRACT

The 450-acre Celanese Fiber Operations (CFO) site is occupied by a polyester raw-material production facility, and is located in Cleveland County, one mile north of Earl, North Carolina. The plant facilities consist of the plant production area, wastewater treatment area, former waste disposal areas, land farm area and recreation, and tree farm areas south of the main plant. The plant began operations in 1960 as Fibers Industries, Inc., and manufactured polyester polymer chip and filament yarn using the chemicals dimethyl terephthalate and ethylene glycol. Celanese Corporation bought the facility in 1983. The CFO waste treatment plant was constructed in phases concurrent with the manufacturing plant. This resulted in the disposal of chemical wastes directly into a drainage ditch during the early years of operation prior to completion of the waste treatment plant. Treated effluent has been discharged to Buffalo Creek since the mid-1960s, when CFO completed construction of the treatment plant. In addition to the discharge from the wastewater treatment plant, CFO also discharges alum-treated bandcaster water directly to Buffalo Creek. Several areas around the plant have been used for waste disposal, including old burning pits for normal plant wastes (polyester and trash), a glycol recovery unit sludge burial area, and a former drum storage and staging area (drums contained solutions that failed to polymerize) excavated and backfilled in the mid-1960s, and two soak-away ponds formerly containing treated sanitary sewage. In addition, four areas of buried waste are located to the north and outside the main plant perimeter fence: a polymer and fiber landfill, a construction debris landfill, a 21-acre sludge disposal area, and a drum storage area which temporarily stored 2,000 to 3,000 drums of waste chemicals and solvents, including lab packs, from 1970 to 1978. The drums were removed and disposed of offsite by 1978. The primary contaminants of concern affecting the ground water include: VOCs including benzene and PCE, organics including phenols, and metals including chromium.

The selected remedial action for this site includes: ground water pump and treatment using air stripping, biological treatment, and carbon adsorption (if necessary), followed by discharge to the onsite wastewater treatment plant. If the treatment system effluent contains metals, such as chromium, above allowable discharge levels, the effluent will be treated using chemical precipitation. The estimated present worth cost for this remedial action is $2,032,000 with estimated present worth O&M of $1,069,230.

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup will attain Federal or State MCLs, whichever are more stringent. Individual cleanup goals were not specified.

INSTITUTIONAL CONTROL: Not applicable.

CHEMTRONICS, NC
First Remedial Action - Final
April 5, 1988

ROD ABSTRACT

The Chemtronics site, an active waste disposal facility, is located in a rural area of Swannanoa, Buncombe County, North Carolina. The 1,027-acre site was developed as an industrial facility in 1952. Several companies operated the facility prior to its purchase by Chemtronics, Inc. in 1978. Waste disposal operations only occurred over approximately ten acres of the site. Existing records indicate the presence of twenty-three individual onsite disposal areas (DAs) which are grouped into six discrete areas: DA-6, DA-7/8, DA-9, DA-10/11, DA-23, and the acid pit. The site can also be divided into two geographical subsections referred to as Front Valley and Gregg Valley. Disposal practices prior to 1971 were not well defined; however, solid waste materials and possibly solvents were incinerated in pits dug in an area previously referred to as the burning ground, and currently referred to as the acid pit area. Additionally, chemical wastes were disposed of in trenches beside this burning ground. Waste materials generated in the production of the chemical warfare agent, 3-quinuclidinyl benzilate (BZ), and the tear gas agent, o-chlorobenzylidene malononitrile (CS), were placed in 55-gallon drums with a neutralizing solution, and then buried onsite in trench-type landfills. From 1971 to 1975, small volumes of liquid wastes were disposed of in onsite pits/trenches. Solid wastes, rocket motors, explosive wastes, and other waste types also were burned in the burning ground area. From 1975 to 1979, Chemtronics, Inc. constructed pits/trenches, as needed, for the disposal of spent acid and various organic wastes. These pits/trenches were constructed in the burning ground area. In 1980, North Carolina ordered Chemtronics to discontinue all discharges to site pits/trenches. The pits subsequently have been back-filled. Starting in 1979, Chemtronics installed a 500,000 gallon lined lagoon over an old leaching field for the biotreatment of waste waters. The incompatibility of the liner with the brominated wastes introduced into the lagoon caused the lagoon to leach its contents. The bio-lagoon was reconstructed in August, 1980, with a different liner, and deactivated in 1984. In September 1984, the U.S. Army Toxic and Hazardous Materials Agency sampled two drums at the surface in DA-10/11. These drums were suspected of containing wastes from the production of BZ. Although no BZ was found, an immediate removal of these drums was initiated in January, 1985, due to heightened public awareness/involvement with the site. The primary contaminants of concern affecting the soil, sediments, ground water, and surface water include VOCs, benzene, PCE, TCE, organics, metals, arsenic, pesticides, and explosives.

The selected remedial action for this site includes: multi-layer capping of DA 6, DA 7/8, DA-9, DA-10/11, and the acid pit area with fencing, placement of a vegetative cover over the cap, and installation of a gas collection ventilation system, if necessary; treatability studies for soils associated with DA-23 to determine the most appropriate soil fixation/stabilization/solidification process and mixing ratios, followed by onsite capping; ground water pump and treatment which may include air stripping, carbon adsorption, or metal removal with treatment and discharge to be determined during design; sampling of pond water and sediments and, if necessary, treatment using the ground water treatment system or the selected soil treatment/containment process; and sediment, ground water, and surface water monitoring. The estimated present worth cost for this remedial action ranges from $6,247,300 to $8,242,900.

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup levels were provided based on MCLs and several TBCs. Some individual goals include: TCE 0.005 mg/l (MCL), benzene 0.005 mg/l (MCL), PCE 0.007 mg/l (RSD), toluene 2.0 mg/l (PMCLG), RDX 0.035 mg/l (USAIWQC), TNT 0.044 mg/l (PPLV), lead 0.05 mg/l (MCL), and chromium 0.05 mg/l (MCL). Some individual soil cleanup goals include: PCBs 10 mg/kg (TSCA), RDX 95 mg/kg (PPLV), TNT 305 mg/kg (PPLV), and CS 43.3 mg/kg (PPLV).

INSTITUTIONAL CONTROLS: Controls will be implemented; however, none were specified.

FLOWOOD, MS
First Remedial Action - Final
September 30, 1988

ROD ABSTRACT

The Flowood site consists of 225 acres of mostly wetlands and lowlands, is located in the Town of Flowood, Rankin County, Mississippi, on the east side of the Pearl River. The site includes wastewater discharge areas and downstream areas adjacent to two industrial manufacturing facilities. The immediate area of the site includes a borrow-pit, a slough or canal used as a discharge area, a flood levee, and a cow pasture with an area of ponded water. The site is bordered to the north and east by various industrial and commerical operations, while forested areas are located west of the site. The nearest residence is more than 0.5 mile south of the site. Two manufacturing facilities have been owned and operated by a series of companies at the Flowood site since the 1950s. The northernmost facility manufactured corrugated boxes, and the southernmost facility produced ceramic tiles through the 1970s, and stoneware cooking pots from the mid-1970s to the present. A routine industrial wastewater inspection conducted by the Mississippi Department of Natural Resources (MDNR) in the fall of 1982 revealed the unpermitted discharge of hazardous substances to the onsite canal. Subsequent sampling detected lead contamination in water and sediments from the canal. The MDNR began an emergency treatment and removal process to address the contaminated wastewater, but discontinued the process when higher levels of lead were found in the canal adjacent to one of the manufacturing sites. In 1983, EPA investigations revealed high lead levels in onsite sludges, sediments, and surface soil. The primary contaminant affecting the soil and sediments is lead.

The selected remedial action for this site includes: excavation and stabilization/solidification through chemical fixation of approximately 6,000 yd^3 of soil and sediments from all contaminated areas, followed by placement of the treated material in the excavated slough/lagoon area, capping with clean top soil and seeding to provide a vegetative cover; and ground water monitoring. The estimated present worth cost of this remedial action is $2,000,000 with a first year O&M cost of $25,000.

PERFORMANCE STANDARDS OR GOALS: A risk-based level of 500 mg/kg of lead has been set as the cleanup goal for soil and sediments.

INSTITUTIONAL CONTROLS: Not applicable.

GOODRICH, B.F., KY
First Remedial Action - Final
June 24, 1988

ROD ABSTRACT

The B.F. Goodrich (BFG) site is a one-acre area consisting of a landfill and waste burn pits and is located outside the zoned area of Calvert City, Marshall County, Kentucky. The site is situated on the eastern edge of a heavily industrialized area. It is bordered on the east by the Airco NPL site, on the west by the B.F. Goodrich Company, on the north by the Tennessee River and on the south by a State highway. (The BFG site and the Airco site were studied as one site for the RI/FS and their remediation will be combined since they are located adjacent to each other and share a somewhat common history of use.) The landfill is a former creek channel made suitable for landfilling by the construction of dikes on the north and west sides. The B.F. Goodrich Company used the landfill between 1965 and 1973 to dispose of approximately 54,000 tons of construction-type waste and plant trash. The company also operated the burn pit area where several pits were used to burn approximately 2.6 million gallons of liquid chlorinated organics. Additionally, 370 yd^3 of salt-brine sludge was buried in an area near the burn pits. From 1973 to 1980, excavation dirt was the only waste disposed at the site. An inspection conducted by the Kentucky Department of Natural Resources and Environmental Protection in May 1980 revealed a leaching problem along the river side of the landfill, and instructed the B. F. Goodrich Company to correct the problem. The Company resolved the problem in June 1980. The site was placed on the NPL in September 1983. The primary contaminants of concern affecting the soil, sediments, and ground water are VOCs including benzene, toluene, and 1,2-dichlorethane (EDC), and other organics including PAHs.

The selected remedial action for this site includes: excavation and consolidation of approximately 5,000 yd^3 of contaminated soil and sediments within the dikes and around the landfill from both the BFG and Airco sites, with onsite disposal in the former burn pit area followed by construction of an organic vapor recovery system and a RCRA cap over the burn pit; reconstruction of the dikes surrounding the landfill for flood prevention; upgrading of the landfill caps and installation of a leachate extraction system with onsite treatment of the leachate and offsite discharge to the local river; pump and treatment at the BFG plant site of ground water using air stripping and biological treatment or activated carbon adsorption and discharge to the local river; possible treatment of ground water with an oil/water separator if ground water contains significant oil, and temporary onsite storage of oil with transport offsite to an oil recycling facility; access restrictions; and institutional controls to prevent residential development. The estimated capital cost for this remedial action (including all costs related to the Airco site) is $6,090,000 with present worth O&M estimated to be $3,130,000.

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup will attain specific ACLs for the selected indicator chemicals at the site and include EDC (8.5 mg/l), benzene (8.5 mg/l), and TCE (8.5 mg/l). Contaminated subsurface soil in the burn pit areas will attain EDC level of 139 mg/kg, which is based on the allowable EDC ground water concentration.

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to prevent residential development and installation of drinking water supply wells.

INDEPENDENT NAIL, SC
Second Remedial Action - Final
August 30, 1988

ROD ABSTRACT

The Independent Nail site, occupying 24.6 acres, is located near the town of Beaufort, South Carolina. The site is surrounded by fields, woodlands, and wetlands. The United States Fish and Wildlife Service in 1987 indicated that endangered and threatened species may exist in the area of influence of the site, however, these species have not been confirmed to be inhabiting areas that may be impacted by the operations at the site. An estimated 25 residents live within one quarter mile of the site. The Black & Johnson Company, previous owners of the site, manufactured metallic screws and fasteners. As part of the manufacturing process, the company discharged approximately 33,000 gallons per day of plating wastewater into an unlined infiltration lagoon. The discharge rate may have been as high as 75,000 gallons per day. The lagoon was in use from approximately 1969 to 1980. The South Carolina Department of Health and Environmental Control reported that wastewater contained some organic cleaning solvents and metals. In April 1980, the Black & Johnson Company ceased operation. Two months later, the Independent Nail Company purchased the plant and currently operates a panneling nail coating process, but does not discharge wastewater to the lagoon. The first remedial action at this site at this site addressed the contaminants in the soil and lagoon sediments. This remedial action at this site addresses ground water contamination. The primary contaminants of concern include chromium, zinc, and cyanide.

The selected remedial action for this site addressing ground water is a no action remedy. The source control remedial action conducted at the site was determined to have little or no impact on ground water quality in the area of the site. This remedial action has no costs associated with it.

PERFORMANCE STANDARDS OR GOALS: The endangerment assessment conducted at the site indicated that there was no risk to human health or the environment from ground water.

INSTITUTIONAL CONTROLS: Not applicable.

NATIONAL STARCH, NC
First Remedial Action
September 30, 1988

ROD ABSTRACT

The National Starch and Chemical Corporation (NSCC) site is located in Rowan County, North Carolina, approximately five miles south of the city of Salisbury. The site consists of 500 acres and is occupied by the NCSS-owned Cedar Springs Road Plant which currently manufactures textile finishing and custom specialty chemicals. Land use adjacent to the site includes residential and industrial developments such as: warehousing operations on the east site; a farm on the south side; and residential areas bordering the southwest and north sides. Ground water in the aquifer beneath the site is currently used as a source of drinking water with the closest well being 2,200 feet northeast of the site. There are 1,539 homes within a 3-mile radius of the site that are outside of the city water lines and potential users of ground water for drinking and other domestic purposes. There is also potential for humans to directly contact or ingest contaminated waters through recreational uses of nearby creeks which receive the surface water runoff from the trench area. From 1971 to 1978, NSCC disposed of approximately 350,000 gallons of reaction vessel wash waters classified as D002 waste (corrosive waste with pH less than or equal to 2.0) in trenches constructed in a 5-acre tract of land located behind the plant. The waste consisted predominantly of salt brines, sulfuric acid solutions, sulfonating fats, and oils and solvents. The wastes were disposed of in several trenches approximately 250 feet by 9 feet deep, running east/west and north/south. Trenches in this area also received liquid effluent from the plant where it percolated into the ground. After the percolation rate substantially declined, the trenches were backfilled and seeded. Site monitoring in 1976 and 1977 revealed shallow ground water contamination adjacent to or within the trench area. Consequently, the North Carolina Department of Natural and Economic Resources requested that NSCC cease onsite waste disposal activities. Since 1978, production plant process waters have been pretreated in a facility adjacent to and south of the production area and discharged to the Salisbury publicly owned treatment works (POTW). The two main areas of contamination identified at the site are the trench area and the wastewater lagoon area. This Record of Decision (ROD) will address remediation of ground water; a subsequent ROD will address soil contamination and, if necessary, sediment contamination. The primary contaminants of concern affecting the ground water, surface water, and sediments are VOCs including benzene, TCE, toluene, and xylenes, and metals including arsenic and chromium.

The selected remedial action for this site includes: installation of a ground water interception and extraction system downgradient of the source area(s) with pretreatment prior to discharge to the POTW (pretreatment may include air stripping, filtration through an activated carbon filter, metal removal, or treatment through the company's existing lagoon system which includes presettling and surface aeration); and surface water and sediment monitoring. If the POTW declines to accept the treated ground water, it will be discharged to a local surface stream under an NPDES permit. The estimated present worth cost for this remedial action is $3,036,000 with annual O&M of $55,000.

PERFORMANCE STANDARDS OR GOALS: Eleven carcinogens and fourteen non-carcinogens have been identified as chemicals of concern at this site and have been given cleanup goals. For both carcinogens and non-carcinogens, cleanup levels are set at the MCL. If an MCL is not available, the cleanup goal for a carcinogen is set at the limit of detection for that substance, or for a non-carcinogen the goal is set at the RfD or ACI equivalent. However, ethyl benzene will meet the proposed MCLG. Individual cleanup goals include: arsenic 10 ug/l (MCL), benzene 5 mg/l (MCL), TCE 5 ug/l (MCL), chromium 50 ug/l (MCL), toluene 2,000 ug/l, and xylenes 350 ug/l. The State of North Carolina belatedly has identified ground water cleanup levels more stringent than those identified previously; however, even if EPA finds these standards to be applicable to the site, they would not alter the remedial action selected.

INSTITUTIONAL CONTROLS: Not applicable.

PERDIDO GROUNDWATER CONTAMINATION, AL
First Remedial Action - Final
September 30, 1988

ROD ABSTRACT

The Perdido Groundwater Contamination site is located in the Town of Perdido, Baldwin County, Alabama. Site contamination occurred as a result of a 1965 train derailment on the Louisville and Nashville Railroad (now CSX Transportation, Inc.). Chemicals (particulary benzene) from derailed tank cars spilled into drainage ditches, infiltrating the underlying aquifer. The area of ground water contamination covers approximately 15 acres and is centered downgradient about 300 yards from the derailment site. The Alabama Department of Public Health, Division of Public Water Supply (ADPWS) first documented reports of taste and odor problems in resident's water wells in 1981. Further studies showed benzene contamination in 6 of 27 wells, which led to supplying bottled water to 250 affected residents. In February 1983 EPA provided immediate removal funding to construct a water supply line to connect to a nearby town. CSXT voluntarily provided funds for and installed the water system in July 1983. The primary contaminant of concern affecting the ground water is benzene.

The selected remedial action for this site includes: ground water pump and treatment using air stripping or activated carbon adsorption with reinjection of treated water back into the aquifer, and air monitoring during operations; and ground water monitoring to measure success of the cleanup. The estimated capital cost for this remedial action is $169,000 with estimated annual O&M cost of $103,000.

PERFORMANCE STANDARDS OR GOALS: The target cleanup goal for ground water is benzene 5 ug/1 (MCL).

INSTITUTIONAL CONTROLS: Not applicable.

WAMCHEM, SC
First Remedial Action - FINAL
June 30, 1988

ROD ABSTRACT

The 21-acre Wamchem site is located in Burton, Beaufort County, South Carolina, on a small island in the midst of a salt marsh near McCalleys Creek, a tidal stream. The creek is considered to be a habitat for the loggerhead turtle, a federally listed threatened species, and a probable habitat for the short-nosed sturgeon, also a federally listed endangered species. The water table aquifer at the site discharges into the creek, and has no distinct confining unit separating it from the underlying Floridian aquifer, the principal aquifer in the region. Between 1959 and 1972, the Beaufort Chemical and Research Company owned and operated the site, producing dyes for the textile industry. In 1972, M. Lowenstein Company purchased the facility and continued operations until 1981. When solvent recovery and recycling operations were discontinued at the site, M. Lowenstein Company closed the plant in 1982. Liquid wastes generated at the site were discharged to a drainage ditch leading to two unlined ponds. A ditch was later extended from one of the ponds, discharging wastes directly into McCalleys Creek. Waste treatment methods changed, and the ponds and ditches were replaced by an unlined holding pond and a waste lagoon in 1972; however, these were soon replaced by two spray fields and a concrete-lined holding pond in 1975. In 1977, the South Carolina Department of Health and Environmental Control (SCDHEC) required the company to use a spray-irrigation technique to improve its wastewater process. The wastes discharged onto the spray fields consisted of neutralized sulfuric acid and process water. Although the system was found to be in compliance with SCDHEC standards, ground water contamination was documented at the site in 1982. Current soil and ground water contaminants include: VOCs, benzene, toluene, xylenes, semi-volatiles, and organics.

The selected remedial action for this site includes: ground water pump and treatment using carbon adsorption with offsite discharge to a stream; excavation and low temperature thermal aeration of 2,000 yd^3 of contaminated soil followed by onsite disposal; and ground water monitoring. The estimated capital cost for this remedial action is $1,310,000, with annual O&M of $155,100.

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup goals were based on Federal Ambient Water Quality Criteria. Soil cleanup goals were based on estimates of contaminants that would not result in future exceedances of AWQC in ground water at the source area due to soil contaminant leaching. Some individual goals include: benzene 2.43 mg/kg, toluene 34.47 mg/kg, total xylenes 67.58 mg/kg, and naphthalene 74.57 mg/kg.

INSTITUTIONAL CONTROLS: Not applicable.

ZELLWOOD, FL
First Remedial Action - Final
December 17, 1987

ROD ABSTRACT

The 57-acre Zellwood site is located in the northwestern corner of Orange County, Florida, approximately one-half mile west of the unincorporated town of Zellwood. Situated in a rural area, the site is occupied by four industries and an open field containing a marshy wetland area. Approximately 300 homes within a one-mile radius of the site depend on private wells as their sole source of potable water. Between 1963 and 1971, Drum Service Company of Florida, a drum recycling facility, operated a wastewater disposal system without a regulatory permit, treating and disposing of generated wastewaters in two onsite evaporation/percolation ponds. In 1980, the company eliminated the use of these ponds for waste disposal and in August 1981 initiated drainage and removal of contaminated sediments from the ponds. Douglas Fertilizer and Chemical Company and Southern Liquid Fertilizer discharged wastewater from their production process into three unlined surface impoundments. Additionally, from 1960 to 1983, the Zellwin Farms Company facility, a vegetable washing and packing plant, discharged wastewaters from the vegetable washing process into a ditch. From 1971 through 1985, the Drum Service Company has had various types of waste treatment and disposal permits issued by the Florida Department of Environmental Regulation (FDER). To date, the Douglass Fertilizer and Chemical Company and the Zellwin Farm Company have not been permitted by FDER. In December 1982, EPA representatives discovered an abandoned drum storage area in the northern section of the Zellwood site. Based on unsubstantiated reports from area residents, material in this drum storage area may have been there for more than 20 years. In the fall of 1983, EPA oversaw a PRP removal action of the abandoned drum area. The primary contaminants of concern affecting the ground water, soil, sediments, and sludge include: organics, inorganics, metals, and pesticides.

The selected remedial action for this site includes: excavation of soils and sediments with onsite incineration and testing of residuals to determine appropriate disposal; ground water pump and treatment with flushing of the treated ground water back through the abandoned drum area to facilitate cleanup of residual contamination; and a long-term ground water monitoring program for private potable water wells. The estimated present worth cost for this remedial action ranges from $41,264,000 to $61,908,000. O&M costs were not provided.

PERFORMANCE STANDARDS OR GOALS: Not specified.

INSTITUTIONAL CONTROLS: Not applicable.

ALLIED/IRONTON COKE, OH
Second Remedial Action - Final
September 29, 1988

ROD ABSTRACT

The Allied/Ironton Coke site is located in the City of Ironton, Lawrence County, Ohio. This remedial action addresses the Goldcamp Disposal Area (GDA) operable unit of the site. The other operable unit, comprised of the coke plant, lagoons, and the tar plant, is addressed in a separate remedial action. The GDA is a four-acre disposal pit located in a mixed industrial/business/residential area bounded by Third Street on the east and the Ohio River on the southwest. Several businesses and institutions are within 100 feet of GDA. Allied Chemical and Dye Company has owned the property since 1955. The GDA was a sand and gravel pit used for disposal of various chemical wastes from three sources between 1945 and 1977. The wastes include: anthracene residue, anthracene salts, phthalic anhydride residue, and miscellaneous process wastes from the Tar Plant; foundry sand containing heavy metals, phenolics, and oils from the Dayton Malleable Iron Company; and wastes disposed of by the Goldcamp Gravel Company. In 1977, Allied decided to discontinue use of the GDA for disposal of chemical wastes. Allied and its contractor, in consultation with the Ohio Environmental Protection Agency (OEPA), completed a closure project at the site in August 1980, which involved removal of standing liquids and filling and capping the site with clay. Subsequent hydrogeologic and water quality investigations indicated that there is ground water contamination at the site which may pose a threat to public health through migration. The volume of the disposal area is approximately 300,000 yd^3. In addition to this primary area of contamination, there is a zone of nonaqueous-phase contaminants which have migrated through the aquifer to the underlying impermeable bedrock layer. The extent of the contaminated area is uncertain, but the volume is estimated to be 156,000 yd^3. The surface of the GDA is also a source of contamination because many substances have oozed up through the existing cap. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, other organics including phenols and PAHs, and inorganics including cyanide.

The selected remedial action for this site includes: construction of a slurry wall around the disposal area from ground surface into the low permeability bedrock; installation of a multi-media RCRA cap over the surface of the disposal area; extraction and onsite treatment of ground water from inside and outside the containment system; provision of an alternate water supply for the Ironton Iron Company until ground water cleanup levels are met; imposition of deed restrictions to limit future uses of the property; and preparation of a supplemental RI/FS to identify the extent and nature of the nonaqueous-phase contaminant layer with implementation of the Agency-approved remedy for this contamination, if different from the present containment alternative. The estimated present worth cost for this remedial action is $13,130,000 with annual O&M costs of $515,000 for approximately 30 years.

PERFORMANCE STANDARDS OR GOALS: The selected remedy will meet ground water cleanup goals based on MCLs, AWQCs and 10^{-6} health-based levels. Specific goals include: ammonia 0.50 mg/l, chloride 250 mg/l, total cyanide 0.2 mg/l, phenolics 0.3 - 3.5 mg/l, benzene 0.005 mg/l, naphthalene 0.69 mg/l, and PAHs (benzo-a-pyrene indicator) 0.005 ug/l. The ground water cleanup ARARs and TBCs may not be technically feasible to attain, particularly for benzene and PAHs; therefore, technical feasibility will be evaluated every five years throughout the remedial action. An ARAR waiver may be appropriate if it is determined that these standards cannot be met.

INSTITUTIONAL CONTROLS: Deed restrictions will be imposed to limit future uses of the property.

BELVIDERE LANDFILL, IL
First Remedial Action - Final
June 29, 1988

ROD ABSTRACT

The Belvidere Landfill (BL), occupying 19.3 acres of the 139-acre site, is located just outside the City of Belvidere, County of Boone, Illinois. The site is located within the 100-year flood plain of the Kishwaukee River, which is adjacent to the site. Located within the site boundaries are two ponds and a drum disposal area. The City of Belvidere owned the landfill from 1939 to 1973, operating first as a municipal landfill until 1965, and then as an industrial landfill until 1973. In late 1970, the City of Belvidere applied for a solid waste disposal permit. The application was to permit the disposal of 52 tons per day of domestic garbage, landscape wastes, partially dewatered sludge, and demolition material. However, in 1971, the operator disclosed that up to 100 tons per day of wastes were being deposited. This waste consisted of 35 tons of residential waste, 30 tons of industrial source waste, and 35 tons of commercial source waste. Approximately 790,000 yd^3 of waste were disposed of at the landfill. IEPA denied the City's permit application in January 1971, and the landfill was formally closed in 1973. Between 1975 and 1982, IEPA repeatedly cited the landfill for inadequate cover violations. In the summer of 1979, sand from adjacent areas and prairie plant vegetation were applied as a final cover. The primary contaminants of concern affecting the soil and ground water include: organics, PCBs, PAHs, metals, and lead.

The selected remedial action for this site includes: RCRA Subtitle C capping over the 19.3-acre landfill; treatment or containment of soil from the drum disposal area following resampling to determine the magnitude of PCB contamination; ground water pump and treatment, possibly using air stripping with discharge to either the Kishwaukee River or the city treatment plant; ground water monitoring; pond and river fish monitoring; installation of an upgraded fence; deed restrictions to control unacceptable onsite activities and construction; and flood control measures to prevent erosion of the cap and landfill contents. The estimated capital cost for this remedial action is $5,900,000 with annual O&M of $271,000.

PERFORMANCE STANDARDS OR GOALS: The ground water extraction and treatment system will operate until a 10^{-6} cumulative life-time cancer risk is met at the point of compliance. PCBs greater than 50 mg/kg will be disposed of or incinerated offsite. PCBs less than 50 mg/kg will be consolidated on the landfill. Quantitative goals were not specified for other contaminants.

INSTITUTIONAL CONTROLS: Access restrictions involve upgrading the existing fence to prevent recreational use of the landfill and to ensure the integrity of the cap. Deed restrictions include controlling unacceptable onsite construction and activities.

COSHOCTON LANDFILL, OH
First Remedial Action - Final
June 17, 1988

ROD ABSTRACT

The Coshocton City Landfill (CCL), an 80-acre landfill, is located in Franklin Township, Coshocton County, Ohio. The landfill is built on abandoned, subsurface strip mines, where an extensive network of mine shafts were developed. CCL is located between two small intermittent creeks that drain toward the Muskingum River, 1.5 miles to the west of the site. The area is characterized by considerable topographic relief, with small streams situated between steep rolling hills. Most of the surrounding land is either woodlands or pasture land used for cattle grazing. The landfill property was used in the early 1900s, and again from the mid-1950s until mid-1979, for subsurface shaft mining of coal. The city conducted landfill operations at the site between 1968 and 1979; however, the operations were not well recorded. The waste received at the landfill consisted of mixed municipal refuse and industrial wastes including relatively inert solid scrap wastes, nonhazardous materials, and hazardous liquid waste types such as spent chlorinated solvents, non-chlorinated flammable solvents, resins, and plasticizers. Much of the landfilled waste is situated in the void created by abandoned strip mine operations. Some waste was also reportedly placed in shallow excavations in the southern portions of the site. Currently, portions of the landfill site are covered with what appears to be mine spoil materials. The cover on the site, however, is not consistent, with little or no cover in some areas. In addition, standing water is observed in several areas. Scattered surface deposits of drums and other metal objects are present at the site. Numerous leachate seeps exist on portions of the landfill. The primary contaminants of concern affecting the surface and ground water at this site include: carbon disulfide, TCE, PAHs, chlorinated and non-chlorinated solvents, and heavy metals (mostly arsenic).

The selected remedial action for this landfill includes: installation of a 2-foot low permeability soil cap over the landfill, with top soil and vegetation; imposition of deed restrictions, including fencing; filling and grading the necessary areas; and possible installation of a gas collection and venting system, as well as a leachate collection system and a drainage layer. This remedial action will also include routine ground and surface water and sediment monitoring to identify changes in contamination concentrations. The implementation of this remedial action will entail a capital investment of $8,010,000 with a present value of O&M cost of $910,000 associated with the remedy.

PERFORMANCE STANDARDS OR GOALS: The goal of this remedy is to reduce the contaminant concentrations in the soil, surface, and ground water. The current health-based risk levels for these media are: 3×10^{-6}, 3×10^{-6}, and 3×10^{-4} (all for arsenic), respectively.

INSTITUTIONAL CONTROLS: Deed restrictions would support and strengthen the effectiveness of the soil cover in limiting direct contact.

EAU CLAIRE MUNICIPAL WELL FIELD, WI
First Remedial Action - Final
March 31, 1988

ROD ABSTRACT

The 500-acre Eau Claire Municipal Well Field (ECMWF) site is located in northwestern Eau Claire County and southwestern Chippewa County, Wisconsin, at the confluence of the Eau Claire River and the Chippewa River. ECMWF supplies drinking water to approximately 57,600 residents and numerous commercial establishments in the city of Eau Claire and Washington Township. Ground water from five municipal wells in the north well field is contaminated with VOCs. The contamination at the ECMWF site has been characterized as two separate plumes with the estimated volume of contamination at Plume 1 and 2 of 1.9×10^8 ft^3 and 2.6×10^8 ft^3, respectively. The Chippewa River is not believed to be affected by this VOC contamination due to municipal well pumping which prevents ground water discharge into the river. In March 1981, as part of the EPA Ground Water Supply Survey, the Wisconsin Department of Natural Resources (WDNR) tested the Eau Claire municipal water supply for VOCs and did not detect VOCs at levels of immediate concern. Additional testing of the city's active production wells in January 1982 showed VOC concentrations below health advisory levels. Due to concern about the future use of the water supply, additional testing was conducted in September 1982 and January 1983 to identify the source and extent of VOC contamination. Several residential wells reported detectable levels of VOCs including 1,1-dichloroethene concentrations in excess of the WDNR health advisory. The primary contaminants of concern affecting the ground water are VOCs including: chloroform, DCE, dichloroethene, PCE, TCE, and trichloroethane.

The selected remedial action for this site includes: ground water pump and treatment using the existing air stripper with discharge of treated water to the municipal water system and untreated water to the Chippewa River; and provision of municipal water to private well users within or near the area of ground water contamination. The estimated capital cost for this remedial action is $1,214,200 with annual O&M of $396,700.

PERFORMANCE STANDARDS OR GOALS: Individual contaminant goals are below MCLs and State Health Advisory levels, are based on the achievement of an additive 10^{-6} risk level. The target cleanup levels (TCLs) for Plume 1 include: trichloroethene 0.5 ug/l, 1,1-dichloroethene 0.1 ug/l, and tetrachloroethene 0.01 ug/l. The TCLs for Plume 2 include: trichloroethane 0.4 ug/l, chloroform 0.06 ug/l, 1,1-dichloroethene 0.007 ug/l, and tetrachloroethene 0.09 ug/l.

INSTITUTIONAL CONTROLS: Not applicable.

FOREST WASTE DISPOSAL, MI
Second Remedial Action - Final
March 31, 1988

ROD ABSTRACT

The Forest Waste Disposal site consists of an 11-acre, abandoned municipal and industrial waste landfill and 9 surface impoundments. It is located in Genesee County, Michigan, 20 miles northeast of Flint, and is surrounded by agricultural land and undeveloped woodlands and wetlands. An estimated 20 to 30 households are located within a quarter mile of the site. Wetlands in the site vicinity drain into Butternut Creek which eventually discharges into the Flint River. The site is underlain by two drinking water aquifers. Forest Waste Disposal conducted landfill operations from 1972-1978, receiving limited types of liquid industrial waste, general household refuse, and drummed waste until 1978. Specific waste material found within the landfill includes PBB-contaminated feed, septic sludge, and drums containing primarily solid and liquid VOCs in high concentrations. The operator was also suspected of discharging liquid wastes into the landfill and onto the ground. In 1982, the site was placed on the NPL. This remedial action addresses the landfill and contaminated ground water on the east end of the site. Contamination from the nine waste lagoons is considered to be the primary source affecting ground water and is addressed in a previous remedial action, which includes: offsite treatment and disposal of lagoon liquid, with onsite treatment and offsite disposal of lagoon sediment, sludge, and soil. The primary contaminants of concern affecting the soil and ground water are VOCs including toluene and TCE, other organics including pesticides, PAHs, and PBBs, and metals including arsenic and lead.

The selected remedial action for this site includes: removal and either onsite or offsite incineration of approximately 4,000 drums and 1,000 yd^3 of associated contaminated soil; installation of a containment system including a RCRA cap, slurry wall, dewatering system, and a leachate collection system; and treatment and disposal of collected leachate. The ground water remedy includes: deed restrictions to prevent use of the ground water as a drinking water source; access restrictions; and ground water monitoring. The estimated present worth cost for this remedial action is $23,820,000 with an annual O&M of $440,500.

PERFORMANCE STANDARDS OR GOALS: The remediation of the landfill will prevent migration of contaminants to a drinking water aquifer in excess of MCLs, lifetime health advisories, and noncarcinogenic reference doses, and will result in an excess lifetime cancer risk range of 10^{-4} to 10^{-7}. The remedial action will also prevent migration to surface water bodies in excess of Federal and State water quality criteria. Cleanup goals for individual chemicals were not specified.

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to prevent use of the ground water onsite and from areas adjacent to the site as a drinking water source.

FORT WAYNE REDUCTION, IN
First Remedial Action - Final
August 26, 1987

ROD ABSTRACT

The 35-acre Fort Wayne Reduction site (FWD) is a former municipal landfill/waste disposal facility located along the Maumee River just east of the city of Fort Wayne, Allen County, Indiana. Two onsite areas are designated as wetlands. In addition, the site lies within a 100-year flood plain. The primary land use in the general area is light industrial and commercial. In addition, other landfills, a wastewater treatment plant and sludge drying beds are located along the Maumee River in the vicinity of the site. Two residential communities are located approximately one-half mile from the site. Before 1967, the site was uncultivated farmland often used for the dumping of unknown waste. The site accepted residential and industrial wastes from 1967 to 1976. Few records were kept on the volume and composition of wastes, or on the industries that generated the wastes. From May 1967 to August 1970, FWD was issued a county permit for public disposal of garbage and rubbish. Wastes were incinerated and the residual ash disposed of onsite. In 1970, FW changed its name to National Recycling Corporation (NRC) and built a recycling plant which apparently became inactive after February 1975. Inspection reports indicated that deposited refuse included: industrial and liquid wastes, municipal wastes, garbage, paper, and wood. A 40- to 60-foot diameter pit adjacent to the Maumee River contained pools of volatile liquids. Wastes were disposed of into the pit by cutting off the drum tops and emptying the contents into the pit. NRC operation became part of Service Corporation America (SCA) in 1973. In 1974, SCA was denied a municipal refuse permit due to site closure problems encountered following high water levels. Hazard Ranking System records indicate the entire site's waste quantity was equivalent to 2,820 fifty-gallon barrels. In 1984, Waste Management Inc. (WMI) acquired SCA and conducted an initial site investigation. The site has been inactive since 1976. The site consists of two characteristically different areas reflecting its historical use: the eastern half of the site was used as the municipal/general refuse landfill (approximately 15 acres), and the western half of the site (approximately five acres) was used for disposal of industrial wastes, building debris, barrels of unidentified wastes, and residual ash from earlier incineration operations. Presently, soil and ground water are contaminated with 43 chemicals of concern including: metals, organics, PCBs, PAHs, phenols, and VOCs.

The selected remedial action for the eastern portion of the site includes: deed and access restrictions; soil capping consistent with State solid waste closure requirements; and long-term ground water monitoring. The selected remedial action for the western portion includes: excavation, re-consolidation, and on- or offsite incineration of approximately 4,600 drums containing liquids from Area C, followed by soil capping in accordance with "hybrid" (alternate landfill) closure requirements; ground water collection and treatment, if necessary, with discharge to the river; deed and access restrictions; provision and maintenance of flood protection measures for the portions of the site within the 100-year floodplain; and compensation for any loss of wetlands due to remedy construction by enhancing onsite wetlands. The estimated present worth cost for this remedial action is $10,020,000.

PERFORMANCE STANDARDS OR GOALS: Contaminant levels in the area of the municipal landfill do not pose a threat to human health or the environment. Ground water monitoring will ensure protection of the river through the use of ACLs as a performance standard. Specific goals will be determined during design. MCLs are not considered ARARs, since ground water is not used as a drinking water source. The fate of ground water in the waste disposal facility area will be determined during design.

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to control future development and ground water use at the site.

IMC/TERRE HAUTE, IN
Second Remedial Action - Final
June 22, 1988

ROD ABSTRACT

The IMC/Terre Haute site is located in southeastern Terre Haute, Vigo County, Indiana. The 37-acre site is bordered on the west by the Milwaukee, St. Paul, and Pacific Railroad and on the east by the Louisville Railroad. The site is part of a semi-industrialized area of Terre Haute and is 1.8 miles east of the Wabash River and 1 mile north of the Thompson ditch. A waste disposal area, encompassing approximately six acres, is located in the northeastern portion of the plant site. From 1946 to 1954 a small facility on a six-acre segment of the property manufactured, packaged, and warehoused technical-grade benzene hexachloride (BHC-tech). This material was confined to areas sold to insecticide manufacturers as a raw material for the production of insecticides, including lindane. The site has been owned by International Minerals and Chemical Corporation since 1975. IMC conducted surficial and subsurficial soil sampling in 1979, finding that contamination was confined to areas within seven feet of the surface and well above the ground water table. Seven ground water monitoring wells were installed at the site, and samples indicated measurable BHC concentrations in two of the wells. In 1980, approximately 28,500 yd^3 of soil, rubble, piping, and other debris were excavated and placed in a secure clay-capped mound to prevent offsite migration of BHC-tech. The cap system included a surface drainage collection system and soil gas venting. The concentration in ground water of lindane, the gamma isomer of BHC, declined relatively quickly after construction of the mound and has continued to decline at a slower rate since 1983. The soil cleanup and mound construction has proven to be effective in containing the source of BHC-tech and in reducing ground water contamination to MCL and MCLG concentrations. The primary contaminants of concern are lindane and total BHC.

The selected remedial action for this site is no further action with a maintenance program, which includes: inspection of the existing cap quarterly and maintenance of the vegetative cover; initiation of a ground water monitoring program (sampling of upgradient and downgradient wells semi-annually for the next five years and then annually until 2010); access restrications; and establishment of a contingency plan. The estimated present worth cost for this remedial action is $159,000 for O&M of the existing system.

PERFORMANCE STANDARDS OR GOALS: Contaminant levels immediately downgradient of the mound are well below the MCL (4.0 ug/l) and MCLG (0.2 ug/l) for lindane in drinking water. Should contamination reach the MCLG level or show a consistent, significant (order of magnitude) rise above prevailing levels over more than two monitoring periods, additional samples will be taken to determine if remedial action may be necessary.

INSTITUTIONAL CONTROLS: Deed restrictions will be imposed on land use of the property.

KUMMER SANITARY LANDFILL, MN
Second Remedial Action
September 30, 1988

ROD ABSTRACT

The Kummer Sanitary Landfill is a 40-acre site located in Northern Township, Beltrami County, Minnesota. The site consists of a 35-acre landfill and the Kummer residence located in the extreme southeast corner of the property. To the north and west of the site, the land is sparsely settled with farm residences. A large residential community lies about 1,000 feet to the east and west, and the City of Bemidge is located one-half mile south of the site. The city uses ground water for its drinking water; its wells are one-quarter mile west of the site. There are numerous wetlands and lakes within the area of the site. Between 1971 and 1983 the site operated as a sanitary landfill, accepting mixed municipal waste. Landfill operations consisted of excavating trenches, filling the trenches with waste materials, and covering the fill with onsite sand and gravel deposits. The trenches may have been excavated to the water table and the waste placed in direct contact with ground water. Beginning in 1974, demolition debris consisting of fly ash and sawdust were disposed of onsite. In 1982 and 1983 the Minnesota Pollution Control Agency sampled ground water from onsite monitoring wells and discovered 19 VOCS including TCE, PCE, and benzene. In 1984, VOCs were also discovered in offsite shallow residential wells downgradient of the site; consequently, in 1985 the site was ordered closed. In June 1985 a ROD was signed to provide an alternate water supply to approximately 244 homes affected by contaminated ground water. The primary contaminants of concern affecting ground water and soil are VOCs such as TCE, PCE, and benzene.

The selected remedial action for this site includes: site grading and consolidation of soil and other waste material; placement of a sloping foundation layer of natural soil fill; capping with a cover system consisting of a gas control layer, a barrier layer of low permeability material (clay or flexible synthetic membrane), and a drainage layer with placement of cover soil and a vegetative layer; access and deed restrictions limiting future site use; and groundwater and landfill gas monitoring. The estimated capital cost of the selected remedy is $7,400,000 to $12,500,000 for the clay cap and $6,900,000 to $11,200,000 for the synthetic membrane, with annual O&M costs of $35,000 and $33,000, respectively.

PERFORMANCE STANDARDS OR GOALS: Not applicable.

INSTITUTIONAL CONTROLS: Access and deed restrictions will be implemented to limit future use of the property.

LASALLE ELECTRICAL UTILITIES, IL
Second Remedial Action - Final
March 30, 1988

ROD ABSTRACT

The LaSalle Electrical Utilities (LEU) site is located in the city of LaSalle, west-central LaSalle County, in north-central Illinois. There are approximately 190 people and 70 residences located within one-eighth mile of the LEU property. LEU, a former manufacturer of electrical equipment, began operating prior to World War II. Between the late 1940s and 1978, PCBs were utilized in the production of capacitors. Undocumented reports allege the application of PCB-contaminated waste oils as a dust suppressant both on and off the property until as late as 1969. Following the regulation of PCBs, manifests document the disposal of PCBs at all regulated facilities. Beginning in September 1975, numerous government agencies conducted various inspections and issued complaints and orders to the LEU company as a result of its manufacturing and handling practices. Soil sampling conducted by the Illinois Environmental Protection Agency (IEPA) in December 1980 documented onsite PCB contamination. Continued soil sampling revealed offsite contamination in March and May 1981. The IEPA ordered the company to cease operations in May 1981. The U.S. EPA conducted Immediate Removal Actions that involved fencing the LEU property and capping a portion of the heavily contaminated onsite property; capping contaminated offsite property to the south of the site; and staging, sampling, and packaging PCB waste material for future disposal. The first operable unit ROD, signed September 19, 1986, addressed offsite soil contamination. This second remedial action operable unit addresses PCB and VOC contamination in soil, sediments, building structures, and ground water.

The selected remedial action for this site includes: excavation and onsite incineration of contaminated soil and replacement with clean fill; high pressure flushing and mechanical cleaning of affected sewer lines; excavation and onsite incineration of contaminated sediment from the unnamed creek downstream of the storm sewer discharge; ground water collection and onsite treatment using phase separation, filtration, and air stripping with discharge to the local waste water treatment plant via sanitary sewers; and demolition and offsite disposal of contaminated LEU building structures. The estimated present worth cost for this remedial action is $34,495,180.

PERFORMANCE STANDARDS OR GOALS: Contaminated ground water will be collected to achieve MCLs for VOCs (specific chemicals and associated values not specified) and PCBs 1 ug/l. Soils will be excavated consistent with the cleanup levels selected in the 1986 ROD. Specifically, the levels for PCBs are 5 mg/kg in surface soils and 10 mg/kg at depths greater than one foot when clean fill material is used to return the area to its original grade.

INSTITUTIONAL CONTROLS: Not applicable.

LONG PRAIRIE, MN
First Remedial Action - Final
June 27, 1988

ROD ABSTRACT

The Long Prairie site, as defined by the extent of the plume of contaminated ground water, extends 2,100 feet by 1,000 feet in Long Prairie, Todd County, Minnesota. The Long Prairie River flows within 500 feet of the contaminant plume. In August and October 1983, routine municipal well monitoring by the Minnesota Department of Health (MDH) indicated contamination in two of five municipal wells. The MDH ordered the two wells shut down in October 1983, and in November 1983 issued an advisory to provide bottled water for area residents. About 50 of the area's 300 private wells were affected by the ground water contamination. Since the advisory was issued, 39 of the 45 homes using contaminated ground water have been connected to the municipal drinking water system. Well monitoring in 1984 implicated an area dry cleaning operation as the potential source of contamination. The primary contaminants of concern affecting 7,000,000 gallons of ground water and 3,800 yd^3 of soil are VOCs including DCE, PCE, and TCE.

The selected remedial action for this site includes: ground water pump and treatment using air stripping with discharge to the river; spill treatment using active soil venting; and ground water monitoring. The estimated capital cost for this remedial action is $890,000 with annual O&M of $390,000 for year 1 and $250,000 for years 2-5. The estimated present worth cost for this remedial action is $2,000,000.

PERFORMANCE STANDARDS OR GOALS: Remediation will attain a 10^{-6} increased cancer risk level. Based on this level, PCE will be treated to 1,200 mg/kg and 5 ug/l in soil and ground water, respectively. The target ground water cleanup level for TCE is expected to be below the MCL value of 5 ug/l.

INSTITUTIONAL CONTROLS: Not applicable.

MASON COUNTY LANDFILL, MI
First Remedial Action
September 28, 1988

ROD ABSTRACT

The Mason County Landfill site is located three miles south of the City of Ludington, Mason County, Michigan. The site occupies approximately 18 acres of a predominantly rural area in Pere Marquette Township. Approximately 10 acres of the site were used as a landfill. Less than 500 feet from the landfill there is a wetland area which drains into Babbin Pond, the headwaters of Iris Creek. There are 14 residential wells within a one-half mile radius of the landfill. The population within a three mile radius of the site is estimated to be 1,112. The Mason County Department of Public Works (DPW) leased the property in 1971 and entered into an agreement with Acme Disposal, Inc., to operate the site as a sanitary landfill. Although the Michigan Department of Natural Resources (MDNR) documented that slurry and sludge wastes from local industries were being dumped at the landfill, the site's license was renewed annually until it was closed in August 1978 after reaching capacity. Public concerns over the water quality in Iris Creek prompted the DPW and MDNR to review closure activities. The site is currently owned by Mason County as result of a settlement with two property owners who filed suit against the county. In 1983, a clay cap was installed over the landfill, and berms and storm drains were constructed to improve site drainage. Two surface aerators were installed in Babbin Pond to facilitate biodegradation of organic matter and 15 gas vents were placed in the top of the landfill. The site has been separated into two operable units; one for the landfill contents and one for the ground water. This source control remedial action addresses the landfill contents. Contamination of the shallow and deep aquifer will be addressed in a subsequent remedial action. Site investigations indicate that contamination of surface water, surface sediment, soil, and offsite air quality are not sufficient to warrant remedial action. The primary contaminants of concern affecting the ground water are VOCs including benzene, PCE, TCE, and xylene.

The selected remedial action for this site includes: construction of a RCRA cap over the landfill; access restrictions; deed restrictions on and near the site to prohibit use of the shallow aquifer; and ground water monitoring. The estimated present worth cost for this remedial action is $2,800,000, with present worth O&M costs of $1,000,000 over 30 years.

PERFORMANCE STANDARDS OR GOALS: The general remedial action goals are to prevent direct contact with contaminant sources and to minimize future release of contaminants. Establishment of performance standards for the cleanup of ground water contamination is deferred until a remedy is selected for the ground water operable unit.

INSTITUTIONAL CONTROLS: Deed restrictions will prohibit future site development or installation of water supply wells on the site.

MID-STATE DISPOSAL LANDFILL, WI
First Remedial Action - Final
September 30, 1988

ROD ABSTRACT

The Mid-State Disposal (MSD) site is an abandoned municipal and industrial waste landfill located in central Wisconsin, in Cleveland Township, Marathon County, about four miles northeast of Stratford. The area surrounding the site includes an abandoned railroad track partially bounding the west and north, two offsite sludge disposal lagoons owned by Weyerhaeuser, Inc., to the northeast, and private property to the south. Site runoff enters nearby waterways including the Rock Creek and the Eau Plune River via unnamed tributaries. Additionally, ground water from the site is believed to be discharging into a ravine 500 feet south of the site. MSD conducted landfilling operations from 1970-1979, receiving municipal, industrial, and commercial wastes as well as construction and demolition debris. Specific wastes received included papermill sludges, asbestos dust, solvents, pesticides, paint sludges, and metals. Four areas of contamination have been identified at the site. These are: a 25-acre landfill located in the center of the site and referred to as the Old Mound area, which contains municipal wastes, papermill sludges, asbestos dust, pesticides, and solvents; a five-acre interim expansion landfill located to the west of the Old Mound area and referred to as the Interim Expansion area, which reportedly contains wastes similar to the Old Mound area with the exception of papermill sludges; a three-acre sludge lagoon located northwest of the Old Mound area which allegedly contains papermill sludges; and an area along the western edge of the property where leachate ponding had occurred. Numerous environmental problems and permit violations were noted by the Wisconsin Department of Natural Resources (WDNR) during a site inspection in 1974. In 1979, Weyerhaeuser Company, a generator of waste disposed at the facility, agreed to abandon the facility properly. The pond leachate was removed, and the three waste disposal areas were covered. Leachate collection systems were installed in late 1979 for both the sludge lagoon and the Interim Expansion area; only the leachate collected from the latter is currently removed and treated offsite. Subsequent investigations revealed that ground water has been contaminated by leachate percolating from the waste disposal areas and the leachate pond down to the underlying aquifer. The primary contaminants of concern affecting the ground water, surface water, and soil are VOCs including benzene, PCE, TCE, and metals.

The selected remedial action for this site includes: installation of new soil/clay caps for the lagoon and landfills; site monitoring that includes ground water surface water, and landfill gas monitoring; offsite ground water monitoring; provision of an alternate water supply for nearby residences; improvement of surface water drainage; leachate and ponded water collection and offsite treatment; access restrictions; institutional controls to prevent well installation onsite; and in situ solidification/stabilization of sludge as necessary for cap support, and landfill gas flaring, if deemed necessary during pre-design. The estimated present worth for this remedial action is $16,000,000 with annual O&M of $22,000 for the first year, and $100,000 for years 2-30.

PERFORMANCE STANDARDS OR GOALS: Ground water will gradually meet state standards and 10^{-6} cancer risk levels for ingestion as a result of natural attenuation and a decrease in leachate contamination.

INSTITUTIONAL CONTROLS: Institutional controls will be established to prevent onsite well installation and soil excavation.

NL/TARACORP/GOLDEN AUTO PARTS, MN
Second Remedial Action - Final
September 29, 1988

ROD ABSTRACT

The NL/Taracorp/Golden Auto Parts site is located in St. Louis Park, Hennepin County, Minnesota. A secondary lead smelting facility operated onsite from 1940 until 1982. Land use adjacent to the site is light industry. There are residential areas within one-quarter mile of the site to the north, east, and west. Aquifers beneath the site serve as primary sources of drinking water in the area, supplying 90 percent of all ground water used in the region. The site was originally owned by NL Industries, Inc., but was later divided and each portion sold to a succession of owners. One of these owners, Taracorp, owned and operated the lead smelting facility from August 1979 until February 1981. Secondary lead smelting operations recovered lead from lead plates, battery fragments, and lead containers. The industrial operations and onsite waste disposal activities resulted in elevated lead levels in air and onsite soil. Under a Consent Order, NL conducted onsite investigations and cleanup activities between 1985 and 1988 including soil remediation, capping the site with asphalt, and establishing a long-term ground water monitoring program. As part of the Consent Order, NL was also required to investigate and, if necessary, clean up soil near the site possibly contaminated by windblown contaminants. This remedial action addresses the possibility of offsite soil contamination. Investigations indicate that offsite soil does not contain elevated levels of lead attributable to the site. There are no contaminants of concern attributable to the site affecting the offsite soil.

The selected remedial action for this site is a no action remedy. The one residential yard that exceeds state and ATSDR guidance levels for soil lead is not clearly attributable to the site, but will be addressed through a cooperative cleanup by NL Industries. There is no capital cost or O&M associated with this remedial action.

PERFORMANCE STANDARDS OR GOALS: The no action remedy attains the state ARAR of 1,000 mg/kg for soil lead, as well as the ATSDR guidance level of 500 to 1,000 mg/kg.

INSTITUTIONAL CONTROLS: Not applicable.

NINTH AVENUE DUMP, IN
First Remedial Action
September 20, 1988

ROD ABSTRACT

The Ninth Avenue Dump (NAD) is a 17-acre inactive chemical and industrial waste disposal site located in Gary, Indiana. NAD is located in a low-lying area with poor drainage. Prior to filling, the site consisted of parallel ridges separated by wetlands areas. Hazardous waste disposal activities occurred at the site from early to mid 1970s with some filling continuing until 1980. The site accepted dry industrial, construction, and demolition waste; oil, solvents, paint solvents, and sludges; resins; acids; and flammable, caustic, and arsenic-contaminated materials. A small-scale auto wrecking operation was observed at the property in 1975 by the Indiana State Board of Health (ISBH) which also documented the presence of 10,000 55-gallon drums at the site, many of which were empty. Additionally, the ISBH estimated that approximately 500,000 gallons of liquid industrial waste and 1,000 buried drums were present at the site. Subsequent inspection revealed portions of discarded auto batteries, drummed liquid wastes, and abandoned tanker trucks. In 1975 and 1980 EPA ordered the site operator to initiate surface cleanups. Subsequently, he removed some barrels, junk cars, and trucks. This first operable unit addresses remediation of an oil layer floating on the ground water surface, the principal environmental threat at the site. The quantity of oil under the site is estimated at 250,000 to 700,000 gallons, of which 100,000 to 500,000 gallons are estimated to be recoverable. Several organic and inorganic contaminants have been detected in the oil in higher concentrations than in other media. Oil seeps have been observed in onsite ponds leading to concerns that the oil may be affecting aquatic life, and an oil sheen has been seen on several surface water bodies. The second operable unit will address buried waste, contaminated soils, and contaminated ground water. The primary contaminants in the oil layer include: VOCs, benzene, toluene, xylene, PAHs, organics, PCBs, metals, and cyanides.

The selected remedial action for this site includes: construction of a soil-bentonite slurry wall to completely surround the hydrocarbon layer; separate extraction of oil and ground water through a series of central extraction wells, followed by storage of the recovered oil in an onsite storage tank and recharge of the treated ground water through recharge wells; and ground water monitoring. Oil treatment will be evaluated in the second operable unit along with treatment of the source material at the site. The estimated capital cost for this remedial action is $1,960,000 with annual O&M of $190,000.

PERFORMANCE STANDARDS OR GOALS: The remedial action invokes the interim remedy waiver for contaminant-specific ARARs in ground water and surface waters; however, ground water extraction and discharge will meet MCLs. Individual MCL goals were not specified.

INSTITUTIONAL CONTROLS: Not applicable.

OAK GROVE LANDFILL, MN
First Remedial Action
September 30, 1988

ROD ABSTRACT

The Oak Grove Sanitary Landfill covers 45 to 50 acres in Oak Grove Township, Anoka County, Minnesota, approximately 38 miles northwest of St. Paul. There are 249 people that live within one mile of the site and 6,786 reside within four miles. The majority of these residents depend on water from wells drawn primarily from the lower aquifer, or surface water sources. Surface runoff from the landfill empties into a wetland to the south. A creek flows through this wetland, discharging to Rum River two to three miles southwest of the site. The landfill received 200,000 to 300,000 cubic yards of waste per year from 1976 until it reached its permitted capacity in late 1983. Most of this waste consists of household trash and garbage. In addition, waste consisting of oil sludge from an oil recycling process, paint and solvent wastes, foundry wastes, metal sludges, organic compounds from pesticide manufacturing, cutting oils and lubricants, and cleaning solvents and inks, are reported to have been buried near the center of the landfill, but their exact location is unknown. Minnesota Pollution Control Agency (MPCA) and Anoka County records indicate a number of violations and operational problems throughout the active history of the site. MPCA discovered a ground water contamination problem from monitoring well samples obtained at the site in 1984. The primary contaminants of concern affecting ground water and surface water are VOCs including ethyl benzene, toluene, and xylenes.

The selected remedial action for this site includes: installation of a security fence; capping with a final cover system consisting of a gas control layer, a barrier layer of low permeable material or a flexible membrane and a drainage layer; topsoil cover and vegetation; deed restrictions; consideration of treatment options for air emissions from gas vents after construction of the final cover; consideration during design of the need for extra protection for frost damage without significantly increasing cost or likelihood of failure; and air and ground water monitoring. The second remedial action will address the ground water contamination and possible remediation of the downgradient plume. The estimated present worth cost for this remedial action is $6,300,000 to $11,100,000 if a clay barrier is installed, or $5,500,000 to $9,300,000 if a synthetic membrane barrier is installed, with annual O&M of $42,000 or $40,000.

PERFORMANCE STANDARDS OR GOALS: This remedy addresses control of contaminant migration and risks associated with exposure to the contaminated materials, and therefore no chemical-specific standards apply.

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to limit further use of the site.

PETERSEN SAND & GRAVEL, IL
First Remedial Action - Final
September 14, 1988

ROD ABSTRACT

Petersen Sand and Gravel (PSG) is a 20-acre mining site and a former disposal area located north of Libertyville, Illinois. The site is part of a tract of land owned since 1979 by the Lake County Forest Preserve District (LCFPD). PSG is bordered by the Des Plaines River to the west, forest preserve land and residences to the east, and agricultural land and small business to the north and south. The site consists of three disposal areas including a three- to four-acre landfilled area reportedly containing construction debris, trees, and tires; an area that contained 400 to 500 55-gallon drums of paint and solvent wastes; and an area that contained approximately 500 drums of solvents and 1,000 paint cans. The entire site is approximately 20 feet below the elevation of the Des Plaines River due to mining operations which are still continuing and are expected to continue until the early 1990s. LCFPD is planning to construct a recreational lake at the site when mining operations cease. Raymond Petersen purchased the property in 1952, which included a 30-acre parcel east and a 20-acre parcel west of the river and began the sand and gravel operations at the site later that year. Between 1955 and 1958, unknown refuse was disposed of in the four-acre landfill. In 1971 the Illinois Environmental Protection Agency (IEPA) investigated reports of illegal dumping and subsequently ordered immediate closure of the site. In 1973, the Illinois Pollution Control Board ordered complete waste removal and covering of the refuse. Additional reports cited that numerous drums were not removed. These wastes, consisting of 55-gallon drums of paint and solvent waste, were removed in 1977. An inspection conducted in 1980 detected no additional buried drums. The Lake County Grading Company (LCGC) took over the mining operations in 1983, and discovered additional buried drums of solvents and paint cans. These containers were removed from the area that year, along with contaminated soil. In 1984, the site was placed on the National Priorities List. A 20-acre area in the northwest corner of the site was the focus of concern. The final remedial investigation report conducted by IEPA was completed in April 1988, indicating no presence of contaminants at levels of concern, thus a feasibility study was not necessary. The investigation analyzed over 150 organic and inorganic compounds, and only maganese and iron exceeded secondary MCLs.

The selected remedial action for this site is no further action, since the findings in the RI indicated that previous removal actions were adequate and that no unacceptable risk remained on site. A lake will be constructed onsite; therefore, surface water and sediment monitoring is recommended both before and after the lake is in place. Ground water and precipitation collected in the mining pits will continue to be discharged to the Des Plaines River in compliance with the NPDES permit until the mining operations cease. There are no capital or O&M costs associated with this remedial action.

PERFORMANCE STANDARDS OR GOALS: There are no performance standards applicable for this remedial action since a remedy of no further action was selected.

INSTITUTIONAL CONTROLS: Not applicable.

POER FARM, IN
First Remedial Action - Final
September 29, 1988

ROD ABSTRACT

The 4.5-acre Poer Farm site is located about four miles north of Charlottesville, in Hancock County, Indiana. The site is an abandoned tract of land with a collapsed house and barn, and an old, inactive well that lies southeast of the house. The surrounding area is open farmland. The nearest house is about one-quarter mile from the site, and the nearby residents rely on private wells for their water supply. There are about 270 homes with a population of about 2,400 within three miles of the site. In 1973, approximately 260 drums of offgrade solvents and paint resins were stockpiled on the Poer property. In 1981 and 1983, the drums and an onsite well were tested and found to contain elevated levels of arsenic, cadmium, lead, and mercury. Emergency cleanup activities were conducted in the summer of 1983. All wastes were removed from the site, and six to eight inches of soil were removed from the drum storage areas. Subsequent sampling showed significantly decreased levels of the heavy metals. The site was fenced and warning signs were posted. An investigation in 1988 indicated that contaminant levels were below Federal and State Health Standards and that there was no threat to human health or the environment.

The selected remedial action for this site is no further action once monitoring wells have been successfully abandoned. Previous removal actions were adequate to protect human health and the environment. There are no costs associated with this no action remedy.

PERFORMANCE STANDARDS OR GOALS: Not applicable.

INSTITUTIONAL CONTROLS: Not applicable.

PRISTINE, OH
First Remedial Action - Final
December 31, 1987

ROD ABSTRACT

The Pristine, Inc., site is located in southwestern Ohio in the City of Reading (population 12,843), a suburb of Cincinnati. The site is bordered by residential and industrial areas. Three hundred feet northeast of the site is a residential trailer park. Eight municipal water supply wells serving the citizens of Reading are located approximately 300 feet northwest of the site. In 1974, Pristine, Inc., began liquid waste disposal operations at the site. Prior to 1974, the site was used for the manufacturing of sulfuric acid. In the spring of 1977, Pristine, Inc., obtained a permit to operate a liquid waste incinerator. In April 1979, as many as 8,000 to 10,000 drums and several hundred thousand gallons of bulk liquids consisting of acids, solvents, pesticides, PCBs, and other chemicals were found onsite. Disposal operations were ordered to shut down in September 1981, in accordance with a partial consent order with the State of Ohio. From June 1980 to November 1983, much of the onsite waste was removed in accordance with a Consent Decree between Pristine, Inc., and the Ohio EPA. Wastes stored and subsequently removed from the site during this period included paint sludges, lab packs, flammable solvents, cyanide wastes, pesticides, chlorinated solvent sludge, DDT, "neutralized" acid sludge, PCB-contaminated soils, incinerator ash, and solvent/sludge mixtures. Between March 1984 and July 1984, soil and waste removal activities addressing immediate hazardous site conditions were performed by some of the PRPs. These activities did not address the long-term risks associated with the site. The results of the RI/FS indicated that over 90 compounds were detected in the soil, ground water, surface water, and sediments including: PCE, TCE, benzene, organics, metals, pesticides, and dioxin (in soils and sediments only).

The selected remedial action for this site includes: excavation and onsite consolidation on the surface of the site of 1,725 yd^3 of contaminated soils and sediments from the pit area; in-situ vitrification of 37,700 yd^3 (average of 10 feet across the entire 2.2-acre site) of contaminated soils and sediments followed by placement of a vegetative soil cover over the vitrified mass; ground water extraction and treatment using air stripping with carbon off-gas and offsite discharge to a creek; decontamination, demolition, and offsite disposal of all onsite structures in a solid waste landfill; installation of a french drain; and implementation of deed and access restrictions. The estimated present worth cost for this remedial action is $17,094,000 with annual O&M of $94,800.

PERFORMANCE STANDARDS OR GOALS: The overall health-based cleanup standard of 10^{-6} cumulative excess cancer risk at the plume boundary will be met for all media. Chemical-specific ARARs were specified for 30 contaminants based on RCRA and Safe Drinking Water Act MCLs and Clean Water Act Water Quality Criteria.

INSTITUTIONAL CONTROLS: Fencing of the western boundary will limit site access and prevent exposure to contaminants present at the site. The use of deed restrictions will be considered during the remedial design.

REPUBLIC STEEL QUARRY, OH
First Remedial Action - Final
September 30, 1988

ROD ABSTRACT

The Republic Steel Quarry site is located in the City of Elyria in Lorain County, Ohio, southwest of Cleveland. The site is situated between West River Road and the West Branch of the Black River, directly west across the river from Franklin School. The site consists of a four-acre quarry containing water surrounded by seven acres of fenced-in property. Elyria surrounds the site, with a population of approximately 58,000. Prior to 1950, the site operated as a sandstone quarry. From 1950 to 1972, approximately 200,000 gallons of waste pickle liquor (acid wastes used in steel processing) were discharged to a ditch located on the east side of the steel plant, which flowed north into the quarry. From 1972 to 1975 the ditch was used for disposing of rinse water from pickling operations. The ditch was dammed in 1976, and after this time sulfuric acid used to pickle the steel reportedly was disposed of directly into the quarry. Heavy metals were detected in ground water downgradient from the quarry during a site investigation conducted by EPA in 1983. Further study identified low levels of numerous contaminants in the ground water. Sediments and surface water within the quarry contain VOCs and metals. Approximately 100 yd^3 of surface soil from the discharge ditch are contaminated with VOCs and metals. The primary contaminants of concern affecting surface water, sediments, and soil are VOCs including toluene, and metals including chromium and lead.

The selected remedial action for this site includes: excavation and offsite disposal in a RCRA landfill of approximately 100 yd^3 of contaminated surface soil from the pickle liquor discharge ditch and from along the southern end of the quarry; implementation of a five-year monitoring plan including a fish species survey and fish tissue bioassay to ensure absence of contaminants; and ground water monitoring. The estimated present worth cost for this remedial action is $63,200. O&M costs were not provided.

PERFORMANCE STANDARDS OR GOALS: Waste pickle liquor is identified as RCRA waste K062, and must meet the specified land disposal restrictions BDAT levels of chromium 0.094 mg/l and lead 0.37 mg/l, as measured in TCLP extract, prior to land disposal. Treatment of the soil at this site is thought not to be needed to meet the BDAT levels but the test will be performed prior to disposal to ensure compliance.

INSTITUTIONAL CONTROLS: Not applicable.

SOUTH ANDOVER, MN
First Remedial Action
March 30, 1988

ROD ABSTRACT

The South Andover site is comprised of several separate parcels of land totaling approximately 50 acres in the southern portion of Andover, Minnesota. One-quarter mile to the north of the site is a residential neighborhood. Further development is planned to the west and the south of the site. A large portion of the site is buried under a pile of tires and miscellaneous junk. Several smaller pieces of property on the site are auto salvage yards. The Waste Disposal Engineering landfill, a Superfund National Priorities List site, is located 3,000 feet northeast of South Andover. Multiple waste handling operations occurred between 1954 and 1981 on several properties within the site boundaries. Consequently, there are multiple source areas which include a drum storage area, a waste discharge area, and a waste burning area. In 1976, citizen complaints of well contamination prompted the Minnesota Pollution Control Agency (MPCA) to investigate the site and issue a Citation of Violation for the storage of chemical waste. Waste processing was discontinued in early 1977, and waste acceptance ceased in 1978. In 1980, the MPCA issued Notices of Violation for improper disposal of industrial wastes. In 1981, the contents of approximately 700 drums were disposed of by mixing them with waste oil and using the mixture as fuel. In 1986, a group of PRPs removed approximately 500 additional onsite drums. Soil investigations have been limited by the presence of a large volume of tires and junked automobiles piled onsite. The majority of the tires are currently being shredded and removed from the site. A subsequent RI/FS for soils and the lower sand aquifer is planned following tire removal. Currently, the primary contaminants of concern affecting the ground water include: arsenic, chromium, lead, metals, VOCs, PCE, TCE, toluene, and organics.

The selected remedial action for this site includes: continuous ground water extraction and discharge to surface water with pretreatment as necessary; provision of municipal water to private well users on or near the site; ground water monitoring; and placement of restrictions on new wells on or near the site. The present worth cost for this remedial action ranges from $920,000 to $2,460,000 depending on the discharge option selected. Present worth O&M ranges from $21,000 to $140,000.

PERFORMANCE STANDARDS OR GOALS: The remedy will meet MCLs by removing the contaminated ground water in exceedance of MCLs. Individual goals include: 1,1,1-trichloroethane 200 ug/l, 1,2-dichloroethylene 70 ug/l, ethylbenzene 680 ug/l, toluene 2,000 ug/l, xylene 440 ug/l, arsenic 50 ug/l, and lead 20 ug/l. PCE and chromium will meet the State Drinking Water Limit of 6.9 ug/l and 120 ug/l, respectively. The extraction well system will operate until the completion of the subsequent RI/FS, regardless of future contaminant levels. Final cleanup levels will be established as part of the subsequent RI/FS.

INSTITUTIONAL CONTROLS: Restrictions will be placed on new wells at or near the site.

SUMMIT NATIONAL, OH
First Remedial Action - Final
June 30, 1988

ROD ABSTRACT

The 11.5-acre Summit National site is a former coal strip mine in rural Deerfield Township, Portage County, Ohio, approximately 45 miles southeast of Cleveland. In the area immediately surrounding the site there are several residences, two landfills, a cement plant, a rollerskating rink, and a used tire storage lot. There are nine residential wells within 1,000 feet of the site. Summit National Liquid Services operated a solvent recycling and waste disposal facility on the site from 1973 to 1978. Solvents, paint sludges, phenols, cyanide, arsenic, and other liquid wastes were stored, incinerated, and buried or dumped during site operations. All onsite media are contaminated with a variety of organic and inorganic compounds, and investigations indicate that offsite areas also are affected. In addition, about 900 to 1,600 buried drums and four buried tanks containing hazardous substances have been identified at the site. In June 1978, EPA ordered Summit National to stop receiving waste materials and remove all liquid wastes from the site. No waste was removed before the owner sold the site in March 1979. Because hazardous chemicals were leaking into the environment, in September 1979 EPA removed three bulk tanks and their contents (approximately 7,500 gallons of hexachlorocyclopentadiene) and contaminated soil, and treated some contaminated water. Surface operations were conducted between November 1980 and June 1982, during which EPA removed drums, tanks, various surface debris, and a small amount of contaminated soil. In March 1987, EPA performed an emergency action to contain and terminate the actual or threatened release of hazardous materials due to the critically deteriorating condition of the ponds at the site. The primary contaminants of concern affecting soil, sediments, ground water, and surface water are VOCs including benzene, toluene, TCE, and xylenes, other organics including phenols, PAHs, and PCBs, and metals including arsenic and chromium.

The selected remedial action for this site includes: excavation and onsite incineration of approximately 32,000 yd^3 of contaminated soil and sediments and the contents of approximately 1,600 buried drums and four tanks, with disposal of incinerator residuals in an onsite RCRA landfill; ground water pump and treatment and onsite surface water treatment using precipitation, flocculation, coagulation, oil and water separation, filtration, and carbon adsorption, and discharge of treated water to downgradient surface water; installation of a RCRA cap over the site, with regrading and revegetation; construction of a slurry wall around the site perimeter; dismantling and onsite disposal of all onsite structures; limited access and deed restrictions; ground water and surface water monitoring; and residence relocation. The estimated present worth cost for this action is $25,000,000 with annual O&M of $1,132,250.

PERFORMANCE STANDARDS OR GOALS: Soil cleanup will attain a 2×10^{-5} cancer risk level. Discharge levels for treated ground water and surface water will meet Federal and/or State water quality standards. Individual cleanup goals for soil and ground water contaminants were not specified.

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to control use of the property.

U.S. AVIEX, MI
First Remedial Action - Final
September 7, 1988

ROD ABSTRACT

The six-acre U.S. Aviex site is located in the City of Niles, Howard Township, Cass County, Michigan. The site lies in a residental neighborhood with single family homes 100 feet to the south, east, and north. Because there are no storm or sanitary sewers nearby, surface runoff from the site and surrounding areas flows toward Bome-Huntly Drain, a tributary of St. Joseph River, and ultimately Lake Michigan. U.S. Aviex produced non-lubricating automotive fluids from the early 1960s until 1978. During operations at the plant, chlorinated hydrocarbons, including trichloroethane (TCA), were released into the vadose zone south of the process room. The subsurface soil still contains significant quantities of TCA, TCE, and PCE. In July 1972, an underground pipeline containing diethyl ether was broken during excavation near the west wall of the packaging room. Over the next several years, diethyl ether contamination was identified in downgradient residential wells southwest of the plant, approximately one-half mile away. U.S. Aviex installed six monitoring wells on the site beginning in 1972 and also provided alternate water supplies to homes with contaminated wells. In November 1978, a fire occurred on the site, and the large volumes of water used to extinguish the fire flushed unknown amounts of chemicals contained in barrels and tanks into the soil. Following the fire, chlorinated hydrocarbons were detected in domestic wells. Based on data developed during a ground water investigation in 1982, a purge and treatment system using air stripping and discharge to surface water was designed and installed to contain the contamination. Contaminated ground water, however, is currently flowing offsite to the southwest into residential areas. The primary contaminants of concern affecting soil and ground water are VOCs including benzene, PCE, TCA, TCE, toluene, and xylenes.

The selected remedial action for this site includes: soil flushing of approximately 11,500 yd^3 of contaminated onsite soil, and collection of onsite and offsite ground water and fluids from the soil flushing process, with treatment onsite by air stripping and discharge to surface water. The estimated present worth cost for this remedial action in $3,024,000.

PERFORMANCE STANDARDS OR GOALS: Ground water target levels are based on MCLs, proposed MCLGs, and Federal or State water quality criteria. Individual goals include benzene 5 ug/l (MCL), toluene 2,000 mg/l (PMCLG), xylenes 440 ug/l (PMCLG), PCE 0.88 ug/l (WQC), and TCE 5 ug/l (MCL).

INSTITUTIONAL CONTROLS: Not applicable.

UNITED SCRAP LEAD, OH
First Remedial Action - Final
September 30, 1988

ROD ABSTRACT

The United Scrap Lead (USL) site is located in a sparsely populated area approximately one mile south of the City of Troy, Concord Township, Miami County, Ohio. The 25-acre site is bounded by two residences, one combined commercial/residential unit, and one commercial establishment. The entire USL site lies within the 100-year floodplain of the Great Miami River. From 1946 to 1980, the site was used by a lead reclamation business, reclaiming lead from used automobile batteries and selling it to lead smelters. The majority of the site is currently owned by Bailen Brothers, Inc., the successor organization to United Scrap Lead, Inc. The lead reclamation operation involved the separation of the batteries from their casings and tops, collection of the lead plates for reprocessing, and the disposal of the tops and casings onsite. The acid was originally discharged directly to an acid seepage field, but beginning in late 1972, the acid was neutralized with ammonia prior to discharge. The site first came to the attention of authorities in June 1967 when USL requested a permit to continue to dispose of the battery casings in the back portion of the property. The request was granted, but in 1972 the Ohio Department of Health required USL to implement a wastewater treatment program to fully neutralize the acid. Subsequent testing of the wastewater indicated high levels of lead, cadmium, and other toxic materials. In November 1985, the EPA Region V Emergency Response Section initiated an emergency removal action. This action removed the contaminated soil and waste materials from the immediate vicinity of the surrounding residences and placed them in a large pile onsite (approximately 55,000 yd^3). The areas of contamination at the site include the waste pile and underlying soil, contaminated site soil (approximately 45,000 yd^3), contaminated buildings, other miscellaneous wastes, approximately 100 empty drums, and several partial or intact empty chemical storage tanks. Approximately 400 yd^3 of sediment in a nearby tributary were found to contain high levels of lead and arsenic, attributed to surface runoff from the waste pile onsite. The primary contaminants of concern affecting the soil and sediments include lead and arsenic.

The selected remedial action for this site includes: excavation and onsite treatment of soil and battery casings by washing, with lead recovery and offsite disposal or recycling of casing residues, and replacement of cleaned residual soil onsite; excavation and dewatering of tributary sediments followed by onsite disposal with treated soil; construction of a soil cover over disposed material and revegetation; decontamination of buildings and debris followed by offsite disposal; installation of a new residential well; imposition of minimal deed restrictions; and groundwater and surface water monitoring. The estimated present worth cost for this remedial action is $26,924,000 with estimated annual O&M costs of $55,375.

PERFORMANCE STANDARDS OR GOALS: Onsite surface soils above 500 mg/kg lead will be excavated and treated to levels which render them non-EP toxic and leave them with less than 500 mg/kg total lead. Subsurface soils which are EP toxic will be excavated and treated to levels which render them non EP-toxic. Sediment in the nearby tributary will be excavated to background lead levels (68 mg/kg).

INSTITUTIONAL CONTROLS: Minimal deed restrictions will be required, because no hazardous waste will be left onsite. However, Miami County will zone the land use.

VELSICOL CHEMICAL, IL
First Remedial Action - Final
September 30, 1988

ROD ABSTRACT

The Velsicol Chemical Corporation (VCC) is a manufacturing facility located in east-central Illinois, approximately one mile north of the City of Marshall, Clark County, Illinois. The site is bordered by a railroad on the south and by an unnamed tributary on the southwest. A total of 334 acres onsite are leased for crop farming. VCC was in operation between the mid-1930s and August 1987, and occupied an area of approximately 420 acres, 172 of which were used for production or disposal practices for petroleum derivatives including resins, solvents, and pesticides (including chlordane manufacturing). All process wastewater has been deep-well injected onsite since 1965 and the majority of the waste solids and sludges generated at the facility were disposed of in a large pond until 1980 when the firm ceased pond operations. The plant ceased operations in 1987. Accidental and intentional offsite releases of wastes were noted during the period the ponds were in operation. In the 1980s, all contaminated soil and visually contaminated sediments were consolidated and stabilized with cement and fly ash, and covered with a temporary clay cap and vegetation. The primary contaminants of concern affecting the soil, sediments, surface water, and ground water are VOCs including benzene and other organics including PAHs and pesticides.

The selected remedial action for this site includes: excavation of 10,200 yd^3 of contaminated stream and pond sediments and 87,900 yd^3 of contaminated soil, backfilling with clay, and revegetation; consolidation of all excavated material onsite in the large pond with in-place stabilization followed by construction of a RCRA cap; construction of ground water collection drain with disposal via onsite deep well injection, or treatment using granular activated carbon prior to offsite discharge; ground water and surface water monitoring; and implementation of land use and deed restrictions. The estimated present worth cost for this remedial action including O&M is $9,080,910.

PERFORMANCE STANDARDS: Ground water and surface water collected from the trench system will be treated to achieve ACLs including benzene 2,000 ug/l; chlordane 0.0048 ug/l; carcinogenic PAHs 0.031 ug/l; noncarcinogenic PAHs 5.4 ug/l; and phenols 100 ug/l. Soil and sediment cleanup goals will attain ACLs including benzene 2 mg/kg; chlordane 0.002 mg/kg; carcinogenic PAHs 0.010 mg/kg; non-carcinogenic PAHs 0.046 mg/kg; and phenols 100 mg/kg.

INSTITUTIONAL CONTROL: Institutional controls including land use and deed restrictions will be provided until the ground water has been cleaned up to allowable levels.

WASTE DISPOSAL ENGINEERING, MN
First Remedial Action - Final
December 31, 1987

ROD ABSTRACT

The Waste Disposal Engineering (WDE) site, consisting of 73 acres of a 114-acre dump, is located in the City of Andover (formerly Grown Township), Anoka County, Minnesota. The site area is characterized by low relief with shallow water tables and numerous wetlands. During the past year, extensive residential development has been or will be constructed and planned for around the site. The original dump was established in 1963 and operated until 1968. Disposal of wastes was by burial or burning in pits or trenches. In 1968, WDE purchased the dump and was licensed by Grow Township to operate as a sanitary landfill. In 1970, WDE submitted a solid waste permit application which included a proposal to build a specially constructed pit for hazardous waste disposal. A permit was issued in March 1971 to operate the site as a sanitary landfill. The pit received approximately 6,600 containers (ranging from one gallon pail to fifty-five gallon drums) from 1972 to 1974, in the form of acids, caustics, waste paints, spent solvents, plating sludges, and cyanides. An undetermined quantity of hazardous waste, much of it bulk loads, was disposed throughout the landfill. Of the 3,200,000 gallons of hazardous waste thought to be disposed at the site, only 10 percent is thought to have been disposed of in the pit. The area of refuse/non-hazardous waste disposal covers an area of 73 acres and contains approximately 2,500,000 yd^3 of waste. Much of the landfill is covered by lime sludge. The landfill and pit have remained abandoned and inactive since February 1984. The site property has gone through tax forfeiture so that it is currently property of the State of Minnesota with administration by the county. Currently, the pit area shows the most serious ground water degradation and is the dominant source of contaminants entering Coon Creek. The primary contaminants of concern include VOCs and organics.

The selected remedial action for this site includes: ground water pump and treatment using carbon adsorption with offsite discharge to Coon Creek; installation of a RCRA cap to completely cover the 73-acre landfill; installation of a clay slurry wall; implementation of institutional controls including well use restrictions; filling in of a wetland; construction of an alternate wetland area; and extensive monitoring. The estimated capital cost for this remedial action is $9,504,796 with present worth O&M of $862,915.

PERFORMANCE STANDARDS OR GOALS: The existing concentrations of contaminants in Coon Creek will be brought to below the 10^{-6} health-based risk level and other freshwater criteria established under the Clean Water Act. The point of compliance will be set at the landfill boundary. Safe Drinking Water Act standards are not ARAR since institutional controls will prevent use of the contaminant ground water. Also, MCLs have not been established for site contaminants.

INSTITUTIONAL CONTROLS: Well use will be prohibited onsite and in adjoining areas.

ATCHISON/SANTA FE (CLOVIS), NM
First Remedial Action - Final
September 23, 1988

ROD ABSTRACT

The Atchison/Santa Fe (Clovis) site is located just south of the Atchison, Topeka, and Santa Fe (ATSF) Railway switching yard in Clovis, New Mexico. The site is comprised of an approximately 26-acre playa lake (Santa Fe Lake) which has been owned by ATSF since the early 1900s. The surrounding area is mostly industrial, and the lake is currently fenced off to public access. The lake was used for the disposal of wastewater from various operations throughout the years. Wastewater from the washing of hopper cars used for hauling potash, cement, fertilizer, grain, and coke were disposed in the lake from 1962 to 1982. EPA and ATSF reached an agreement under an Administrative Order on Consent for ATSF to conduct an investigation of the lake area. The investigation included sampling of the lake water, the sediments at the bottom of the lake, the soils between the lake bottom and the water table, and the ground water underlying the lake. The major concern at this site is the potential threat to ground water. The aquifer that extends under the lake is the source of drinking water for the City of Clovis. Although contamination of the ground water does not pose a current threat to the city water supply, it does indicate that migration of contaminants from the lake is possible if the source of contamination is not removed. The primary contaminants of concern affecting the sediments, soil, surface water, and ground water are metals including arsenic, chromium, and lead, organics including phenols, and inorganics.

The selected remedial action for this site includes: construction of a run-on control dike and ditch system; evaporation of the water in Santa Fe Lake through a pump and spray sprinkler system; excavation and onsite treatment of the lake sediments through biodegradation; in situ biodegradation of contaminated soil followed by excavation and placement in the land treatment area; capping the land treatment area with a PVC liner and vegetated soil layer; grading and revegetation of the disturbed area; access restrictions; and ground water and land treatment area monitoring. Additional action may be taken to remediate ground water contamination if subsequent monitoring results indicate the need for action. The estimated present worth cost for this remedial action is $2,840,000.

PERFORMANCE STANDARDS OR GOALS: The selected remedy is aimed at preventing contamination of the aquifer and will meet all primary State and Federal standards for drinking water.

INSTITUTIONAL CONTROLS: ATSF will be prohibited from installing drinking water wells within site boundaries.

BAILEY WASTE DISPOSAL, TX
First Remedial Action - Final
June 28, 1988

ROD ABSTRACT

The Bailey Waste Disposal site is an inactive industrial waste facility located approximately three miles southwest of Bridge City, Orange County, Texas. The site is part of a saltwater marshland near the confluence of the Neckes River and Sabine Lake, and lies within the 100-year floodplain. The site occupies approximately 280 acres and includes two rectangular ponds (A and B) constructed by dredging the marsh and piling the sediments to form levees. The ponds were constructed in the mid-1950s as part of the Bailey Fish Camp, which operated until the 1960s. Industrial wastes, primarily organics, were disposed of along the north and east margins of Pond A during the 1950s and 1960s. Four separate areas of contamination in the vicinity of the ponds have been identified. They include: a waste channel, located north of Pond A that contains a minimum of 44,000 yd^3 of industrial waste and debris; an area east of Pond A containing 21,000 yd^3 of municipal and industrial waste; a drum disposal area south of Pond A containing 58 corroded drums with an estimated volume of 80 yd^3 of industrial waste; and a series of waste pits, north of Pond A and west of the waste channel, containing 1900 yd^3 of tar-like wastes. The primary contaminants of concern affecting the sediments include: VOCs including benzene and toluene, aromatic and chlorinated hydrocarbons, organics including PAHs, and metals.

The selected remedial action for this site includes: relocation, consolidation, and treatment of contaminated sediments and wastes using a solidification technique developed during design, followed by onsite disposal and capping of the residual matrix. The estimated present worth for this remedial action is $13,700,000.

PERFORMANCE STANDARDS OR GOALS: Because ARARs exist at this site for contaminated soil and sediments no chemical specific ARARs are available. The lifetime risk attained for the direct contact scenario for an adult exposed to the maximum concentration of contaminants found at the site will be 9×10^{-6} and for a child it is 1.2×10^{-5}.

INSTITUTIONAL CONTROLS: Not applicable.

BRIO REFINING, TX
First Remedial Action - Final
March 31, 1988

ROD ABSTRACT

The 58-acre Brio Refining site is located in Harris County, Texas, approximately 20 miles southeast of Houston. The site is broken into two parcels, 49-acre Brio North and 9-acre Brio South, separated by Drive Farm Road. The site is bordered by Mud Gully, a flood control ditch that drains into Clear Creek, Dixie Oil Processors NPL site, Friendswood oil field, and the Southbend residential subdivision. Between 1957 and 1982, the site refined crude oil and styrene tars to produce toluene, ethylbenzene, aromatic solvents, naphthalene, diesel fuel, and kerosene. Various owners of the site stored styrene tars in 24 open pits. Other waste products and sludges were stored in aboveground tanks. Site investigation indicate that between 500,000 to 700,000 yd^3 of onsite soil have measurable contamination, and that high levels of VOCs exist in ground water underlying the site. Primary contaminants of concern affecting the soil and ground water are VOCs including 1,2-dichloroethane, 1,1,2-trichloroethane, and methylene chloride; and base/neutral organic compounds including phenanthrene and fluoranthene.

The selected remedial action for the Brio Refining site includes: excavation and incineration or biological treatment of all onsite soils, sludges, and liquids found to be above action levels defined in the Endangerment Assessment, with backfilling of all treated material passing the Toxicity Characteristic Leaching Procedure (TCLP). If the Brio Site Task Force (PRPs) can successfully demonstrate the effectiveness of aqueous-phase biological treatment such treatment will be considered; otherwise, incineration will be selected. Also included are: excavation and treatment of all visual onsite seeps; excavation and removal of all offsite soils contaminated above background levels; further investigation of Pit G to locate sludge or contaminated soil underlying the existing onsite wastewater treatment impoundment; consolidation and disposal of all inert debris and rubble with ultimate disposition to be determined during remedial design; disposition of Mud Gully, the flood control ditch, to be determined during remedial design; in-place stabilization of wastes existing in the wastewater treatment impoundments, backfilling with dike materials, capping, regrading, and vegetating to improve runoff, and installation of a package wastewater treatment system or routing wastewater to a POTW; removal and offsite disposal of tank contents, and decontamination, dismantling, and selling or offsite disposal of tanks; dismantling of all onsite process equipment; monitoring ambient air; control of air emission from the treatment processes; venting waste enclosures to an emission control device; treatment of ground water in the Numerous Sand Channel Zone to a level to be determined in design; natural attenuation of the Fifty-Foot Sand Aquifer with monitoring to ensure effectiveness; regrading and vegetating areas outside excavation boundaries; construction of a stormwater transmission system draining to Mud Gully; and imposition of deed restrictions as necessary. The estimated present worth cost of this remedial action is $23,308,000-$23,333,000 for biological treatment or $22,458,000-$26,598,000 for incineration based on 62,900 yd^3 of treatable material.

PERFORMANCE STANDARDS OR GOALS: Media above Endangerment Assessment action levels will be treated to target levels based on a 10^{-6} incremental cancer risk for carcinogens, and on an acceptable chronic daily intake for non-carcinogens. Individual action and target levels were not specified. Offsite soil contamination above unspecified background levels will be removed. Ground water in the channel will be treated to a level determined during design. Since the ground water may never be used as a ground water source, immediate application of MCLs is not appropriate.

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented as needed.

DIXIE OIL, TX
First Remedial Action
March 31, 1988

ROD ABSTRACT

The 26.6-acre Dixie Oil Processors (DOP) site is located in Harris County, Texas, approximately 20 miles southeast of Houston. The site is broken into two parcels, 19-acre DOP North and 7.6-acre DOP South, separated by Dixie Farm Road. The site is bordered by Mud Gully, a flood control ditch that flows into Clear Creek, Friendswood Oil Field, the Brio Oil Refining NPL site, and various athletic fields. Between 1969 and 1978, the DOP North parcel operated as a copper recovery and hydrocarbon washing facility. Six surface impoundments were used to store copper wastewater, and wastewater from the hydrocarbon washing operation prior to recovery and treatment. In 1977 the impoundments were closed and decommissioned and the property sold to DOP. In 1978, DOP began operations on the South parcel of the site. These activities included the following: regeneration of cuprous chloride catalyst; hydrocarbon washing to produce ethylbenzene, toluene, aromatic solvents, and styrene pitch; oil recovery; and blending and distilling chemical residues to produce fuel oil, creosote extender, and molybdenum concentrate catalyst. The North parcel was not used in these operations. All site activities ceased in 1986. Wastes were disposed of onsite in tanks, drums, and waste pits. Sampling indicates contamination of surface and subsurface soils and shallow ground water. The primary contaminants of concern affecting soil and ground water are ethylbenzene, hexachlorobenzene, copper, 1,1,2-trichloroethane, and methylene chloride.

The selected remedial action for the Dixie Oil Processors site is a limited action alternative consisting of: site controls including, but not limited to, fencing and deed restrictions to prevent site access; excavation and removal of contaminated offsite soils to background levels, the extent of removal to be determined during remedial design; consolidation and disposal of onsite debris and rubble, disposal method to be determined during design; remediation of Mud Gully, details to be determined during design; operation of the existing wastewater treatment system during implementation of remedial action, then dismantling and removal upon completion; removal and disposal of tank contents and drums, and dismantling, decontamination, and either selling or offsite disposal of tanks; dismantling and disposal of all process equipment; ambient air sampling; control of air emissions from treatment processes, if necessary; sampling and monitoring of Mud Gully sediments and ground water to determine effectiveness of remedy; and regrading and vegetation of the entire DOP site. The estimated present worth costs of this remedy is $241,000.

PERFORMANCE STANDARDS OR GOALS: Excavation of offsite contaminated soil to background levels.

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to prevent site access and development.

FRENCH LIMITED, TX
First Remedial Action - Final
March 24, 1988

ROD ABSTRACT

The French Limited, Inc., (FLI) site, a 22.5-acre tract of land, is located in Harris County, Texas. The site is situated one mile east of the San Jacinto River. The entire site is within the 100-year flood plain of the River and has flooded frequently in the past. Between 1966 and 1972, approximately 300,000 yd^3 of industrial wastes from area petrochemical companies were deposited in an unlined 7.3-acre pit, formerly an active sand pit. The disposal site operated under a temporary permit issued by the Texas Water Quality Board. In 1973, the permit was revoked after extensive public hearings and legal proceedings, and FLI was ordered to cease operations. As part of the settlement, FLI was ordered to remove all the structures, tankage, and process equipment. The tract of land was ultimately deeded to the State. During a flood event, the dike surrounding the waste pit was overtopped and breached, and contaminated sludges were discharged into an adjacent slough. In 1982, the U.S. EPA conducted an immediate Removal Action (IRA). The dike was repaired and the majority of discharged sludges were pumped back into the pit. The floating portion of the sludges was removed and disposed of in July 1983 during another U.S. EPA IRA. Ground water has been heavily contaminated by the leaching action of organic wastes deposited in the pit. Sludge and soil from the waste pit and adjacent slough include the following primary contaminants: PCBs, PCP, organics, VOCs, metals, and arsenic.

The selected remedial action for this site includes: in-situ biodegradation of sludges and contaminated soils with aeration of the lagoon waste for degradation enhancement; stabilization of residues followed by on-site disposal; ground water pump and treatment; surface water discharge to the San Jacinto River with treatment, as necessary; backfilling of the lagoon to grade and contour; and ground water monitoring. The estimated present worth for this remedial action is $47,000,000.

PERFORMANCE STANDARDS OR GOALS: Ground water recovery and treatment will continue until modeling shows that a reduction in the concentration of VOCs to a level which attains the 10^{-6} human health criteria can be achieved through natural attenuation in ten years or less. Additionally, remediation will be consistent with TSCA regulations and policy for cleanup of PCBs and PCB contaminated material, Water Quality Criteria for ground water and surface water, including criteria established in the SDWA and its MCLs. Individual cleanup goals were not specified.

INSTITUTIONAL CONTROLS: Not applicable.

GURLEY PIT, AR
Second Remedial Action - Final
September 26, 1988

ROD ABSTRACT

The Gurley Pit site consists of a 3.25-acre pit located approximately one mile north of Edmondson, Crittenden County, Arkansas. The site lies within the 100-year flood plain of Fifteen Mile Bayou, which discharges to the Mississippi River. Land in the vicinity of the site is sparsely populated with five residences located within a one-half mile radius. The primary land use is agricultural. Gurley Refining Company (GRC) leased the site from R.A. Caldwell between 1970 and 1980. During this time the pit was divided by levees into three cells and used between 1970 and 1975 as a state permitted disposal site for secondary oil refining wastes including acids, oil sludges, PCBs, inorganics, and spent diatomaceous wastes. In March 1975, citizen complaints regarding discharges from the pit led to investigations by the Arkansas Department of Pollution Control and Ecology (ADPCE), which discovered permit and State environmental statute violations by GRC. GRC abandoned the site in 1976. In May 1978, EPA and ADPCE received complaints of chronic overflows from storm runoff. These overflows had an adverse affect on fish and waterfowl in the Fifteen Mile Bayou. Subsequently, EPA conducted separate spill cleanup operations in July 1978 and April 1979. EPA completed an Enforcement Decision Document (EDD) in October 1986, which addressed the source control operable unit consisting of the waste in the pits and the surface contamination. The selected source control remedy included treatment and discharge of on-site surface water, off-site incineration of PCB-contaminated oil, ground water monitoring and stabilization, and on-site disposal of contaminated sludge, sediment, and soil. This ROD addresses the ground water operable unit. Investigations have determined that contaminants from the pit have not migrated through the subsurface into the ground water. Elevated levels of inorganics (specifically arsenic and manganese) were detected but were consistent with background levels. No site-related contaminants were identified in the ground water.

The selected remedial action for this site is no further action beyond that already specified in the source control operable unit EDD. The ground water will be monitored for at least thirty years to ensure that no migration of the contaminants occurs. There are no Federal capital or O&M costs associated with this remedial action.

PERFORMANCE STANDARDS OR GOALS: Concentrations of metals (e.g., arsenic, iron, and manganese) that exceeded MCLs in ground water were not attributable to the pit contaminants but exist in elevated levels naturally; therefore, ground water cleanup levels are not applicable for this site.

INSTITUTIONAL CONTROLS: Not applicable.

INDUSTRIAL WASTE CONTROL, AR
First Remedial Action - Final
June 28, 1988

ROD ABSTRACT

The eight-acre Industrial Waste Control (IWC) site, an abandoned coal strip mine, is a closed industrial waste landfill about eight miles southeast of Fort Smith near Jenny Lind, Sebastian County, Arkansas. Landfilling operations began in the late 1960s or early 1970s and primarily dealt with municipal refuse and debris and industrial trash. In August 1974, the site was purchased by Grady Shipley and granted an industrial landfill permit by the Arkansas Department of Pollution and Ecology. The site received a wide variety of liquid wastes (including methylene chloride, phenols, cresylic acid, and paints), solid wastes, and sludges. In addition, the site possibly contains about 9,000 buried drums. In March 1977, surface impoundments overflowed and contaminated a local pond and pastures north of the site resulting in a fish kill in the pond and the death of several cattle. Consequently, the site was covered, recontoured, and closed by the State in 1978. Land use around the site primarily consists of pasture land and low density residential areas. Although no residences within a one-half mile radius north of the site depend on private wells for drinking water, several local wells are still used for watering lawns and livestock, a fish pond, and occassionally for domestic uses when the municipal supply is not functional. Four areas of contamination have been identified at the site. Area A is the deepest portion of the strip mine which ran along the entire northern portion of the site, and includes drums containing solidified wastes typically of dried paint and solidified foam. Area B lies south of the strip mine and includes shale spoils from surface mining and random crushed drums. Area C is located in the center of the site and contains two former surface impoundments constructed in 1975 and used as evaporation ponds for bulk liquids. Shale spoils, crushed used drums, landfill debris, and sludge-like sediments were also found in Area C. Area D, located in the extreme southwest corner south of Area B, contains intact, liquid-filled and crushed drums as well as contaminated shale spoil. Approximately 19,500 cubic yards of contaminated soil is located in Area C and D. The primary contaminants of concern affecting the soils, sediments, ground water, and surface water include: VOCs including toluene, organics, and metals including arsenic, chromium, and lead.

The selected remedial action for this site includes: installation of a french drain along the south, west, and east sides of the site with a synthetic liner or other barrier, such as a slurry wall installed on the site side of the french drain; excavation of Area D liquid-filled drums with off-site disposal; excavation and on-site stabilization of Areas C and D soil with on-site disposal of residual matrix in the Area C excavation pit; categorization of solid and liquid wastes resulting from previous investigations with disposal consistent with Area C and D materials; ground water pump for off-site treatment, mixture with the contaminated soil and stabilized on-site, or treatment in an on-site facility with discharge to be determined during design; multilayer RCRA capping to cover the area bound by the french drain system and the northern site border; surface water diversion using ditches and berms; access and land use restrictions; and ground water and site monitoring. The estimated present worth cost for this remedial action is $11,400,000.

PERFORMANCE STANDARDS OR GOALS: The stabilized matrix will pass the RCRA Toxicity Characteristic Leaching Procedure and/or other EPA-approved leachate test as well as the ASTM strength test. Ground water plant discharge and effluent limitations will be established by EPA and ADPCE. MCLs for arsenic, cadmium, chromium, lead, and TCE are relevant and appropriate ground water cleanup standards; however, the quantitative MCL goals were not specified.

INSTITUTIONAL CONTROLS: Land use restrictions will be implemented to maintain the integrity of the Remedial Action and to prevent further on-site development.

KOPPERS TEXARKANA, TX
First Remedial Action
September 23, 1988

ROD ABSTRACT

The Koppers Texarkana site is located within the City of Texarkana, Texas. The site consists of a 34-acre residential area and a 28-acre former sand and gravel operation. The site is bordered by the Texas and Pacific Railroad to the north, an unnamed creek to the northwest, Wagner Creek to the southwest, Jameson Street to the south, and a drainage ditch to the southwest. The entire site is within a 100-year flood plain. The Koppers Company operated the site as a wood preserving facility from 1910 to 1961, using pentachlorophenol (PCP), creosote, and metallic salts in the operation. The facility consisted of an operations area, a drip track, and treated and untreated wood storage areas. The site is currently owned by Carver Terrace, Inc., which built a subdivision of 79 single-family homes on a portion of the site, and the Kennedy Sand and Gravel Company, which mined sand and gravel on their parcel from 1975 to 1984. Two other owners of small portions of the site are the Mount Zion Missionary Baptist Church and Jesse and Otha Pace. The Texas Department of Water Resources (TDWR) became aware of the site in 1979 through the Ekhardt Survey. The sand and gravel pit was fenced off, and in 1985 EPA covered 24 residential lots with soil and sod to protect the residents while the RI/FS was conducted by Koppers under an Administrative Order on Consent. The RI indicated that the highest concentration of site contaminants in the soil were located near the operations and drip track areas of the old wood preserving facility. In addition, the highest concentrations in the ground water were noted in or near pockets of non-aqueous phase liquids (NAPLs) also in these site areas. The primary contaminants of concern affecting the soil, ground water, and sediments are VOCs including benzene, xylenes, and toluene, other organics including PAHs and PCP, and metals including arsenic.

The selected remedial action for this site includes: excavation of approximately 3,300-19,400 yd^3 of soil from residential yards where CPAH levels exceed 100 mg/kg, with backfilling using clean soil, landscaping disturbed yards, and on-site treatment of the soil using soil washing, with disposal in the Kennedy Sand and Gravel pit or an off-site hazardous waste disposal facility; temporary relocation of sensitive residents (if necessary); collection of NAPLs via trenches in the Kennedy Sand and Gravel pit and/or via a well nest in Carver Terrace, and treatment at an on-site waste water treatment plant using oil/water separation followed by activated carbon or fluidized carbon bed treatment, with recycling or off-site incineration of recovered NAPLs and reinjection of treated ground water into the aquifer; ground water monitoring; excavation and treatment of drainage ditch sediments in the soil washing unit; and deed and access restrictions. The estimated present worth cost for this remedial action is $6,400,000, which includes annual O&M costs of $300,000.

PERFORMANCE STANDARDS OR GOALS: The cleanup goal for contaminated soil is 100 mg/kg carcinogenic PAHs, corresponding to a risk factor of 3×10^{-5}. The ground water levels of free phase creosote will be remediated to a level of nondetection.

INSTITUTIONAL CONTROLS: Deed notices will be imposed for the Kennedy Sand and Gravel property.

NORTH CAVALCADE STREET, TX
First Remedial Action - Final
June 28, 1988

ROD ABSTRACT

The 21-acre North Cavalcade Street site is located in northeast Houston, Texas. The surrounding areas are a mixture of residential, commercial, and industrial properties. Surface water is drained by three stormwater drainage ditches, one of which flows into Hunting Bayou, a limited aquatic habitat as classified by Texas Water Quality Standards. The site was developed in 1946 when Houston Creosoting Company, Inc., (HCCI) established creosote wood preserving operations. Around 1955, HCCI added pentachlorophenol (PCP) wood preservation services and other support facilities. Wood preserving operations ceased in 1961, and the property was sold in 1964. Subsequent property owners divided the site into smaller tracts and sold them to a succession of owners. There has been no industrial activity at this site since 1964. Between September 1985 and November 1987, EPA sampled all environmental media and found PAHs, VOCs, and components of creosote in soil, ground water, and sediments. The area of soil contamination corresponds to where creosote was historically stored, and the point of entry for the contaminants into the ground water. The plume of contamination currently covers approximately four acres. Creosote components were found in drainage ditch sediments probably as a result of rainfall runoff during the time of historical operations. The primary contaminants of concern affecting the ground water, soils, and sediments include: VOCs, benzene, toluene, xylene, and PAHs.

The selected remedial action for this site includes: biological treatment of 22,300 yd^3 of soil (in situ is preferred, however, the optimum method will be determined after pilot testing); ground water pump and treatment of 5,600,000 gallons using oil/water separation and carbon adsorption with re-injection into the aquifer, or, if necessary to maintain the water balance, discharge into an on-site drainage ditch which discharges into Hunting Bayou; and off-site incineration of all non-aqueous phase liquids (NAPLs) separated out from the ground water. The estimated present worth cost for this remedial action is $4,210,000. There is no O&M associated with this remedy.

PERFORMANCE STANDARDS OR GOALS: Soil and ground water cleanup will attain a cumulative 10^{-5} cancer risk level. Individual soil cleanup goals include PAHs 1 mg/kg and benzene 0.04 mg/kg. Individual goals for ground water include: benzene 5 ug/l (MCL), toluene 2,000 ug/l, and xylene 440 ug/l. Additionally, ground water will be treated until all NAPHs are completely removed.

INSTITUTIONAL CONTROLS: Not applicable.

ODESSA CHROMIUM I, TX
Second Remedial Action - Final
March 18, 1988

ROD ABSTRACT

The Odessa Chromium I site consists of a series of chromium-contaminated wells within 300 acres of residential, commercial, and industrial properties and facilities immediately west of West County Road, just outside the northwestern city limits of Odessa, Ector County, Texas. Nearly every residence or commercial facility is served by one or more water wells completed in the underlying Trinity Aquifer, which offers the only source of potable ground water. Two potential sources of ground water contamination at the site have been identified: 4318 Brazos property and 2104 West 42nd Street. In December 1979, the Texas Department of Water Resources identified the 4318 Brazos property as a potential source of chromium contamination. Several chrome plating operations functioned at this property between 1972 and 1977. The site at 2104 West 42nd Street is presently operating as a metal plating facility. This property was first identified as a possible source of ground water contamination in 1978. The first operable unit ROD, signed in September 1986, provided for the extension of the city's water supply until final ground water remediation is complete. Although chromium is the primary contaminant of concern affecting the ground water, other inorganics have been found in the soil.

The selected remedial action for this site includes: demolition and disposal of a building at 4318 Brazos; ground water pump and treatment using electrochemical techniques with reinjection into the Trinity Aquifer; and ground water monitoring. The estimated present worth cost for this remedial action is $2,836,000.

PERFORMANCE STANDARDS OR GOALS: The EPA Primary Drinking Water Standard for chromium 0.05 mg/l was used as the basis for the target concentration. This MCL standard is currently under review by EPA. Should the standard be revised prior to implementing the design phase of the project, the revised standard will become the target concentration. The risk associated with the ingestion of chromium in the soil approaches the 10^{-6} risk level; therefore, soil remediation is not considered necessary.

INSTITUTIONAL CONTROLS: Not applicable.

ODESSA CHROMIUM II, TX
Second Remedial Action - Final
March 18, 1988

ROD ABSTRACT

The Odessa Chromium II site consists of a series of chromium-contaminated wells within 200 acres of residential, commercial, and industrial properties and facilities just outside the northwestern city limits of Odessa, Ector County, Texas. Nearly every residence or commercial facility is served by one or more water wells completed in the underlying Trinity Aquifer, which offers the only source of potable ground water. Two separate contaminant plumes are bounded by the site: 5329 Andrews Highway and 57th Street and Andrews Highway. In 1970, local health department authorities investigated a complaint of contaminated well water (5.5 mg/l chromium) on the property to the south of 5329 Andrews Highway. At that time, wastewater analysis did not indicate the presence of chromium, but in 1978, a cleaning vat solution, which was eventually stored in partially buried steel tanks, contained 2.8 mg/l of chromium. One of the storage tanks was discovered leaking and the tanks were subsequently removed. The facility at 57th Street and Andrews Highway has been in operation since about 1950. Chromates were utilized in the cooling system until about 1976. This system was apparently tied into one of the plant's water wells and during occasional slow downs, cooling water could have been inadvertently back flushed into the well since there was no check valve. The plant also utilized an unlined pit for the disposal of contaminated wastewater, including chromate wastes from the cooling water system, until about 1977. The first operable unit, signed in September 1986, provided for the extension of the city's water supply until final ground water remediation is complete. Although chromium is the primary contaminant of concern to the ground water, other inorganics have been found in the soil.

The selected remedial action for this site includes: ground water pump and treatment using electrochemical techniques with reinjection into the Trinity Aquifer and ground water monitoring. A treatability study will be conducted during the system design phase of the project to aid in designing an appropriate treatment system. The estimated present worth cost for this remedial action is $3,618,000.

PERFORMANCE STANDARDS OR GOALS: The EPA Primary Drinking Water Standard for chromium 0.05 mg/l was used as the basis for the target concentration. This MCL standard is currently under review by EPA. Should the standard be revised prior to implementation of the design phase of the project, the revised standard will become the target concentration. The risk associated with the ingestion of chromium in the soil approaches the 10^{-6} risk level; therefore, soil remediation is not considered necessary.

INSTITUTIONAL CONTROLS: Not applicable.

OLD MIDLAND PRODUCTS, AR
First Remedial Action - Final
March 24, 1988

ROD ABSTRACT

The Old Midland Products site is an abandoned creosote and pentachlorophenol wood preserving plant and sawmill located in Ola, Yell County, Arkansas. The site is flat with a total area of approximately 37 acres. Between 1969 and 1970, Old Midland Products treated wood with creosote. Effluents from the treatment process containing PCP and polynuclear aromatic compounds were discharged into lagoons via a moveable discharge pipe. Pond overflows of minor consequence have occurred with drainage to the intermittent stream west of the lagoons. The land, originally owned by the Old Midland Products Company, was sold in 1979 to the Plainview - Ola Economic Trust, Inc. Approximately 9,000 to 21,000 yd^3 of soil, 850 yd^3 of drainage sediments, 450,000 gallons of ground water, 620,000 gallons of lagoon fluids, and 2,770 yd^3 of lagoon sludges are contaminated with PCP and polynuclear aromatic hydrocarbons.

The selected remedial action for this site includes: on-site thermal destruction of the contaminated surface soils, lagoon sludges, and drainageway sediments, with on-site disposal of waste residuals and a vegetated cover and ground water pump, and treatment using carbon adsorption, possibly with biodegradation pretreatment. The estimated cost for this remedial action is $12,000,000.

PERFORMANCE STANDARDS OR GOALS: The cleanup level for total pentachlorophenol (PCP) contained in soil, sludges, and sediments is 1 mg/kg. Ground water cleanup will attain a 10^{-5} cancer risk level.

INSTITUTIONAL CONTROLS: Not applicable.

SAND SPRINGS, OK
Second Remedial Action
June 28, 1988

ROD ABSTRACT

The 235-acre Sand Springs Petrochemical site, located in Sand Springs, Oklahoma, is a former refinery and solvent recycling facility that operated between 1900 and the early 1970s. The site is located immediately west of Tulsa along the northern bank of the Arkansas River and consists of unlined acid sludge pits, a surface impoundment, solvent and waste oil lagoons, and several subsurface sludge pits and spray ponds. During plant operations, waste products were disposed of in the unlined pits, surface impoundments, and spray ponds. Primary contaminants of concern affecting the soils, shallow ground water, and sediments were organic solvents and heavy metals. In September, 1987, a source control Record of Decision was signed to control and destroy the major sources of contamination. This second Record of Decision deals with the remainder of the site, primarily shallow ground water and minimally contaminated soil.

The selected remedial action for the remainder of the Sand Springs site is no further action. Based upon the findings of the RI/FS, the Endangerment Assessment for the operable unit concluded that no significant risk to public health or the environment exists. Ground water and the Arkansas River water will be monitored for 30 years after completion of the source control remedial action, and warning signs and fences will be erected as part of this no action alternative. Estimated capital cost of the remedy is $9,300 with annual O&M costs of $45,600.

PERFORMANCE STANDARDS OR GOALS: The ROD did not specify individual goals; however, nearby residential wells have not been affected and should not become affected based on the direction of ground water flow, which is towards the river. In a worst case scenario, discharge from the site to the river would be 4.6 times less than NPDES regulatory standards.

INSTITUTIONAL CONTROLS: Site access restrictions will be implemented.

SOL LYNN, TX
First Remedial Action
March 25, 1988

ROD ABSTRACT

The 0.75 acre Sol Lynn site, also known as the Industrial Transformers site, is located in Houston, Texas. The area around the site is a mix of residential, commercial, and light industrial facilities. Approximately 2,000 residents and 100,000 other people move within a one-mile radius of the site on a daily basis due to recreational activities associated with the area. The site operated as an electrical transformer salvage and recycling company between 1971 and 1978 and as a chemical recycling and supply company from 1979 through 1980. The first documented investigation of this site took place during the fall of 1971 when the City of Houston Water Pollution Control Division noted that workers at Industrial Transformers poured oil out of electrical transformers onto the ground during transformer dismantling. In 1981, strong odors originating from the site were brought to the attention of the Texas Department of Water Resources, the predecessor agency of the Texas Water Commission (TWC). Upon inspection, approximately 75 drums were found scattered about the property. Most of the drums, labeled "trichloroethylene", were empty and had puncture holes. A technical assessment of the site, commencing in January 1986, indicated the presence of PCB contamination. PCB contamination has been confined to the top two feet of soil. The highest concentrations of PCBs were found in the middle of the site. TCE has migrated deeper than the PCBs and away from the site. Residual TCE remaining in the surface soil will be remediated along with the PCB contaminated soils. Any TCE that has migrated into the deeper ground water will be addressed in the subsequent remedial action. The primary contaminants of concern affecting the soil are PCBs.

The selected remedial action for this site includes: excavation of approximately 2,400 yd^3 of PCB-contaminated soil and treatment using alkali metal polyethylene glycolate (APEG) complex dechlorination with on-site disposal of treatment residuals; effectiveness verification of the dechlorination process through treatability studies; and pretreatment of liquid by-products, if necessary, with discharge into a publicly owned treatment works facility. The estimated present worth cost for this remedial action is $2,200,000.

PERFORMANCE STANDARDS OR GOALS: Soil will be treated at or below the health-based criterion for PCB-contaminated soils of 25 mg/kg based on the Toxic Substances Control Act Spill Cleanup Policy.

INSTITUTIONAL CONTROLS: Not applicable.

SOL LYNN, TX
Second Remedial Action - Final
September 23, 1988

ROD ABSTRACT

The 0.75 acre Sol Lynn site, also known as the Industrial Transformers site is located in Houston, Texas. The area around the site is a mix of residential, commercial, and light industrial development. The residential population in the area is approximately 2,000, and a maximum daily traffic of 100,000 persons may move within a one-mile radius due to recreational activities. The site was used for electrical transformer salvage and recycling between 1971 and 1978 and for chemical recycling and supply from 1979 through 1980. An investigation during late 1971 by the Houston Water Pollution Control Division revealed that workers at the site poured oil out of electrical transformers onto the ground during transformer dismantling. In 1981, strong odors originating from the site prompted further investigation, which found approximately 75 drums scattered about the property. Most of the drums, labeled "trichloroethylene," were empty and had puncture holes. In 1986, the site was divided into operable units to address soil and ground water contamination. A previous ROD addressed on-site contaminated soil. This ROD addresses contaminated ground water in the class IIB aquifer directly below the site. The primary contaminant of concern affecting the ground water is TCE.

The selected remedial action for this site includes: ground water pump and treatment of approximately 12 million gallons using air stripping, with discharge to a POTW or reinjection into the water-bearing zone. The estimated present worth cost for the remedial action is $2,204,890. O&M costs were not provided.

PERFORMANCE STANDARDS OR GOALS: Ground water treatment will meet the MCL for TCE of 5 ug/l.

INSTITUTIONAL CONTROLS: Not applicable.

SOUTH CAVALCADE, TX
First Remedial Action - Final
September 26, 1988

ROD ABSTRACT

The 66-acre South Calvacade site is located in northeast Houston, Texas. The surrounding areas are a mixture of residential, commercial, and industrial properties. Stormwater runoff flows to two stormwater drainage ditches, which flow into Hunting Bayou, a limited aquatic habitat as classified by Texas Water Quality Standards. The site was used as a wood preserving and coal tar distillation facility from 1910 to 1962. The wood preserving facility consisted of an operations area, a drip track, and treated and untreated wood storage areas. The operations area included wood-treating cylinders, chemical storage tanks, and a waste water lagoon. Creosote and metallic salts were used in the operation. Subsequently, the site was sold, divided into smaller tracts and resold to the current owners. The site is currently used by three commercial trucking companies, which have erected four buildings on the northern and southern parts of the site. In 1983, the Houston Metropolitan Transit Authority investigated the site for potential mass transit use and found evidence of buried creosote. Beginning in November 1985, EPA sampled all environmental media and found two discrete areas of contamination at the site corresponding to the former locations of the wood treating operations and coal tar plant in the southern portion of the site, and a pond previously existing in the northern portion of the site. PAHs, VOCs, metals, and components of creosote were detected in the soil, sediments, and ground water. The primary contaminants of concern affecting the ground water, soils, and sediments are VOCs including benzene, toluene, xylenes, other organics including PAHs, and metals including arsenic, chromium, and lead.

The selected remedial action for this site includes: excavation and on-site washing of 19,500 yd^3 of soil, replacing the soil in the excavated areas capping and treating wash water in the ground water treatment system; in situ soil flushing of 10,500 yd^3 of soil; ground water pump and treatment of 50,000,000 gallons using physical/chemical separation, pressure filtration and carbon adsorption with re-injection into the aquifer or, if necessary, discharge to the on-site drainage ditch which flows into Hunting Bayou; off-site incineration or recycling of all non-aqueous phase liquids separated out from the ground water; and ground water monitoring. Alternatively, in situ biological treatment of soil and ground water will be considered if a potentially responsible party can demonstrate its equivalent or superior performance and implementability costs. The estimated present worth cost for this remedial action is $13,000,000.

PERFORMANCE STANDARDS OR GOALS: Soil cleanup will attain a cumulative 10^{-5} cancer risk level. Individual soil cleanup goals include CPAHs 700 mg/kg and no leaching potential (which may require removal of total PAHs above 150 mg/kg). Ground water cleanup will attain a cumulative 10^{-4} cancer risk level. Individual goals for ground water include: CPAHs no detection, benzene 5 ug/l (MCL), toluene 28 ug/l (MCL), xylene 440 ug/l (MCL), and arsenic, chromium, and lead 50 ug/l (MCLs).

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to control land use.

SOUTH VALLEY/EDMUNDS STREET, NM
Second Remedial Action
June 28, 1988

ROD ABSTRACT

The South Valley/Edmunds Street site is a large area in the southern part of the City of Albuquerque, New Mexico, surrounding the municipal water well known as San Jose 6. Within this large area are a number of industrial properties owned and operated by different groups and individuals. This remedial action addresses the Edmunds Street Ground Water operable unit of the South Valley site. The Edmunds Street property is located in the southeastern corner of the site. The focus of this operable unit is the area around the monitoring well SV-10, referred to as the drainage pit area, on the Edmunds Street property. This area is the low spot of the property and receives much of the property drainage. Analyses of this area have shown significant levels of industrial solvents in the soil and a plume of contaminated ground water starting at the drainage pit area and extending to the east. The ground water source will be treated as a sole-source aquifer because there are no alternate sources available to the City of Albuquerque. The contaminated ground water currently poses a direct threat to Albuquerque's water supply by moving toward the city's well fields. The primary contaminants of concern affecting the ground water include VOCs such as PCE and TCE.

The selected remedial action for this site includes: ground water pump and treatment using air stripping (packed tower aeration), with reinjection of the treated water into the aquifer through infiltration galleries and ground water and air monitoring. The present worth cost for this remedial action is $874,000, with present worth O&M costs estimated at $280,200.

PERFORMANCE STANDARDS OR GOALS: The contaminated ground water will be treated to a PCE level of 20 ug/l as required by the New Mexico Water Quality Control Commission regulations, and to the MCL for TCE of 5 ug/l as required by the Safe Drinking Water Act.

INSTITUTIONAL CONTROLS: Not applicable.

SOUTH VALLEY/SJ-6, NM
Third Remedial Action
September 30, 1988

ROD ABSTRACT

The South Valley/SJ-6 site is located on the southern margin of Albuquerque, New Mexico, just north of South Valley. The total site encompasses the SJ-6 municipal well and six industrial facilities and their surrounding properties within an approximately one-mile radius. Land use is primarily industrial and agricultural with residential areas located immediately north of the site. Industrial development began in the South Valley area just prior to the 1940s. Metal parts were manufactured in the area starting around 1948. By the 1960s, organic chemicals were being handled and packaged on the site. Currently, petroleum fuels and various chlorinated organics are stored, handled, and used within the South Valley areas. Ground water contamination was first suspected in 1978 when foul tastes and odors were noted in ground water from a private well on the Edmunds property in South Valley. Subsequent sampling revealed the presence of several VOCs in three municipal wells including SJ-6. One of the wells was resampled in 1988 and found to be free of contaminants, another well was taken out of service because of mechanical problems, and SJ-6 was shut down in 1980 due to the continual detection of low levels of solvents. This ROD addresses only the source and extent of ground water contamination in the vicinity of SJ-6. Principle threats at the site (i.e., the source and emanating plumes of contamination from surrounding areas) are being addressed through remedial actions initiated by EPA in separate RODs. The primary contaminants of concern affecting the ground water are VOCS including 1,1-DCE, PCE, and TCE.

The selected remedial action for this site includes: removal and disposal of 100 yd^3 of contaminated sediments at the base of the SJ-6 borehole; sealing abandoned wells; ground water monitoring; and access restrictions. The estimated present worth cost for this remedial action is $4,000,000 with estimated annual O&M of $300,000.

PERFORMANCE STANDARDS OR GOALS: All risks to human health will be eliminated by the removal and disposal of sediments at the base of the SJ-6 borehole which appear to be the source of contamination. Remediation on adjacent sites as well as source control at this site will reduce plume concentrations to below state health criteria within five years. Federal health criteria are already being met.

INSTITUTIONAL CONTROLS: Restrictions will be implemented to ensure that wells are constructed using techniques that prevent cross-contamination of zones and are deep enough to prevent exposure to contaminants.

SOUTH VALLEY/PL-83, NM
Fourth Remedial Action
September 30, 1988

ROD ABSTRACT

The Former Air Force Plant 83/General Electric Operable Unit (PL-83) is a portion of the South Valley site in Albuquerque, New Mexico. The South Valley site is an area surrounding the City of Albuquerque Municipal Water Well known as San Jose No. 6. The General Electric (GE) property is located in the western portion of the site. The South Valley site is situated in an industrial area, but there are residences immediately north of the GE property, which has been the site of manufacturing operations since 1948 when the Eidal Manufacturing Company had a welding operation on-site. In 1951 the Atomic Energy Commission, through American Car Foundry, took over the property and conducted machining of metal parts, plating, welding, and other activities. This continued until 1967 when the Air Force took over the property and converted the plant into an aircraft engine manufacturing plant operated by General Electric. The plant was sold to General Electric in 1983, and currently produces aircraft engine parts. The contaminants which caused the listing of the South Valley site on the NPL consisted mainly of industrial solvents. Investigations into the GE property were conducted in 1984, 1985, 1987, and 1988 by the Air Force under a Memorandum of Understanding with EPA. The GE property is heavily built up, with the majority of the site paved or covered with buildings. As a military contracting facility, access to the plant is tightly controlled and there is no regular access other than by employees. Three areas of contamination have been identified at the site: four hazardous waste storage areas which were used for chemical storage, the north parking lot (a former dirt parking lot which was sprayed with oil as a dust control measure), and the DWB-2 area which contains methylene chloride and freon contamination. The volume of contaminated soils is estimated to be 36,000 yd^3. In addition to soil contamination, ground water contamination occurs at depths of up to 160 feet. The primary contaminants of concern affecting the ground water and soil are VOCs, including PCE, and metals.

The selected remedial action for this site includes: installation of soil vapor extraction wells; extraction of soil vapor under vacuum; decontamination of effluent air through a carbon adsorption system; further sampling and definition of soil contamination; installation of ground water extraction wells in both the shallow aquifer and the deeper zone; treatment of extracted ground water with air stripping followed by carbon adsorption and reinjection of treated water into the aquifers (chemical or physical treatment of ground water will occur where metal concentrations exceed background or ARARs); and further definition of ground water contamination through installation and sampling of additional monitoring wells. The estimated present worth cost for soil remediation is $1,820,000. No figures are given in the ROD for the ground water remedial action.

PERFORMANCE STANDARDS OR GOALS: Soils treatment will continue until the vapor extraction system ceases to produce volatile contaminants. Water extraction will continue until the levels of contaminants in the water fall below State and Federal regulatory standards. Individual contaminant goals were not specified.

INSTITUTIONAL CONTROLS: Not applicable.

STEWCO, TX
First Remedial Action - Final
September 16, 1988

ROD ABSTRACT

The Stewco site, previously a tanker truck terminal and truck washing facility, is located in northeastern Texas, in Eastern Harrison County, south of the city limits of Waskom. The site consists of two nonadjacent locations approximately one mile apart, referred to as Location 1 and Location 2. Location 1 is a one-half acre plot that includes a maintenance shop with fueling facilities, a truck-tank washing facility, and two backfilled and capped evaporation ponds (ponds 1 and 2) that received wastewater from the tank washing operation. Approximately 50 homes are located within one-half mile of Location 1; four of these are within 500 feet of the north, west, and south site boundaries. In addition, shallow wells are located approximately one mile to the north. Location 2 consists of a third pond which received excess wastewater conveyed by truck from the evaporation ponds at Location 1. Approximately 30 homes are within a one-half mile radius of Location 2. Land use within a one mile radius of the two locations includes residential, recreation, industrial, and commercial. The underlying Wilcox aquifer serves the city of Waskom as well as numerous domestic users within a three mile radius of the site. From 1972 through 1979, R.A. Corbett Transport, Inc., owned, operated, and maintained a fleet of transport trucks engaged in contract hauling for the oil and gas industry and various businesses. Stewco purchased the site in 1979 and continued operations until declaring bankruptcy in 1983. Materials hauled included glue, resin, gasoline, diesel, jet fuel, and creosote. The wastewater generated from washing the outside of trucks and the tank residue resulting from steam cleaning the inside of the tankers were directed to pond 1, with overflow entering pond 2 and the surplus transported to the third pond at Location 2. All ponds were unlined. Reports from the Texas Water Commission files indicate numerous instances of noncompliance with permit requirements. After abandonment in 1983, ponds 1 and 2 began to overflow their dikes, creating a serious threat of dike collapse and significant hazardous substances release. Consequently, EPA conducted a removal action at Location 1 from March 31 to April 14, 1984. The action consisted of removing the source of contamination: 400,000 gallons of liquid wastes were pumped, treated, and discharged; and 5,500 yd^3 of sludges from the bottom and sides of the disposal ponds were stabilized and disposed of off-site. The pond disposal area was then backfilled and capped. No removal or remedial actions were taken at Location 2 since the level of contamination was much less than that of Location 1 and the pond was not filled near capacity. The contaminants of concern prior to the removal action were VOCs, PAHs, and phthalates.

EPA determined that, based on the effectiveness of the previous removal action, the residual contamination remaining in the soil, pond sediments, and ground water poses no threat to public health and that no long-term monitoring is necessary. Therefore, no further action will be taken at this site. However, ground water contamination has been identified that is not attributed to the site. Follow-up actions by the State and EPA will attempt to determine the source of this contamination. If within 2 years of the signing of this ROD, wells on-site at Stewco are determined to be of no use to the off-site source investigation, closure will be initiated. The cost of plugging the 16 wells is estimated not to exceed $5,000.

PERFORMANCE STANDARDS OR GOALS: Chemical-specific goals met by this no action remedy were not specified.

INSTITUTIONAL CONTROLS: Not applicable.

UNITED NUCLEAR CORPORATION, NM
First Remedial Action
September 30, 1988

ROD ABSTRACT

The United Nuclear Corporation (UNC) site is located approximately 17 miles northeast of Gallup, in McKinley County, New Mexico. The site operated as a State-licensed uranium mill facility from June 1977 to May 1982. It includes an ore processing mill (about 25 acres) and an unlined tailings pond area (about 100 acres). The surrounding area is sparsely populated, with the nearest residence located 1.5 miles from the site. In July 1979, approximately 23 million gallons of tailings and pond water were released to a nearby river as a result of a dam breach in the tailings pond area. The site damage was repaired; however, attention was focused on ground water contamination resulting from tailings seepage. Consequently, UNC implemented a ground water pumping system that withdrew ground water from the aquifers underlying the site and sent it to an on-site borrow pit for evaporation. UNC also conducted tailings neutralization from late 1979 to early 1982. Nevertheless, the off-site migration of radionuclides and chemical constituents from uranium milling byproduct materials into the ground water, as well as to surface water and air, are still principal threats at the site. This remedial action will address on-site ground water contamination. Source control and on-site surface reclamation will be implemented under the direction of the Nuclear Regulatory Commission and integrated with this ground water operable unit. The primary contaminants of concern affecting the ground water are metals including arsenic and radioactive substances including radium-226/228 and gross alpha.

The selected remedial action for this site includes: implementation of a ground water monitoring program to detect any increases in the areal extent or concentration of ground water contamination outside the tailings disposal area; ground water pump and treatment using existing and/or new extraction wells to control and remove tailings seepage and remediate contaminated ground water, with discharge to an enhanced mister/pond evaporation system; and implementation of a performance monitoring and evaluation program. The estimated present worth cost for this remedial action is $17,000,000 over a 10-year period, with estimated annual O&M of $1,000,000.

PERFORMANCE STANDARDS OR GOALS: Contaminant concentrations in ground water will attain MCLs or New Mexico Water Quality Act standards (or background levels where these are higher). Individual cleanup goals include arsenic 50 ug/l (MCL), cadmium 10 ug/l (MCL), cobalt 50 ug/l (NMWQA), radium-226/228 5 pCi/L (MCL), selenium 10 ug/l (MCL), and gross alpha 15 pCi/L (MCL).

INSTITUTIONAL CONTROLS: Not applicable.

ARKANSAS CITY DUMP, KS
First Remedial Action
September 29, 1988

ROD ABSTRACT

The 200-acre Arkansas City Dump site is located in the southwest section of Arkansas City, Cowley County, Kansas, and is bounded on the west and south by a levee that separates it from the Arkansas River. The site falls within the 100-year floodplain and includes a north waste area and a south waste area, both located in the central portion. Land use adjacent to the site is a mixture of crop land and rangeland and commercial and residential areas. Urban areas exist to the north and east of the site with residential areas bordering on the north and mixed residential and commercial areas on the east. Approximately 60 residences are adjacent to the eastern boundary, and several businesses that employ about 100 to 150 people are located on-site. Ground water flows predominantly to either the southwest or southeast toward the Arkansas River due to a ground water divide that exists near the center of the site. Upgradient ground water is used for drinking purposes by Arkansas City as well as private residences. Downgradient, east and southeast of the site, private wells are used to provide water primarily for lawn and garden watering. The site was used as an oil refinery between 1916 and the mid-1920s. Residual acid sludge from the distillation process was disposed of in pits or on the ground predominantly in the north waste area. Subsequently, 160 acres were used as a municipal landfill, referred to as the Arkansas City Landfill. For over 50 years, alkaline sludge from Arkansas City's water treatment plant, as well as municipal refuse and solid wastes were disposed into lime-sludge ponds located in the south waste area. Investigations conducted since 1980 by the Kansas Department of Health and Environment have determined that all media are contaminated with various organics and inorganics, primarily from refining wastes. This contamination is a result of 1,300,000 ft^3 of acid sludge and between 500,000 to 1,000,000 gallons of residual oil product, which has mixed with the subsurface soil predominantly between the north and south waste areas. The principal contributor of organic contaminants to the ground water, particularly polynuclear aromatic hydrocarbons (PAHs), appears to be the soil contaminated sediments in the subsurface. However, contaminants are not migrating off-site. This Record of Decision (ROD) addresses remediation of acid sludge in the north waste area; a subsequent ROD will address the oil-contaminated sediments and ground water contamination. The primary contaminants of concern in the acid sludge are organics, including PAHs and sulfuric acid.

The selected remedial action for the north waste area operable unit includes: in situ neutralization of the acid sludge followed by the installation of a soil cover; completion of a supplemental feasibility study addressing remedial alternatives for the subsequent operable unit; institutional controls including deed restrictions; and ground water monitoring.

PERFORMANCE STANDARDS OR GOALS: Neutralization of acid sludge will attain a pH less than 2.0 and eliminate the potential for sulfur dioxide emissions.

INSTITUTIONAL CONTROLS: Deed restrictions and other institutional controls will be implemented to prohibit soil excavation and construction of buildings on any part of the site still containing hazardous materials, and to ensure that drinking water supply wells are not drilled into contaminated parts of the aquifer.

BIG RIVER SAND, KS
First Remedial Action - Final
June 28, 1988

ROD ABSTRACT

The Big River Sand (BRS) site is located one-half mile west of the Arkansas River and adjacent to the Wichita Valley Center Floodway, in Sedwick County, Kansas. The site consists of approximately 123 acres, half of which has been extensively mined for sand and gravel. Sand and gravel mining is still active on the property. During the early 1970s, approximately 2,000 drums of paint-related waste were disposed of on the eastern portion of the site, adjacent to a five-acre sand quarry lake. In 1978, 80 acres of the site containing the drum storage area and quarry lake were sold to BRS. In 1982, as a condition of the sales agreement, the drums were moved to an unsold portion of the site. Nearly 200 drums were transferred before the Kansas Department of Health and Environment (KDHE) halted the action because the area was not permitted to store or dispose of the waste. KDHE conducted the initial site inspection in August 1982 and identified damaged, corroded, and leaking drums. Paint sludges were determined to be EP-toxic for chromium, and waste solvents and paint sludges from several drums contained metals and VOCs. Waste solvents from the barrels were determined to be hazardous due to their ignitability. A PRP was ordered by KDHE in September 1982 to conduct a removal and site cleanup. These occurred between 1982 and 1984. Sampling by KDHE between 1982 and 1985 detected arsenic, lead, and selenium in drinking water wells, and VOCs, including toluene, in on-site soils and monitoring wells.

It has been determined that the site does not pose a significant threat to public health, welfare and the environment. Therefore, no further action has been selected as the preferred alternative. The estimated future cost, if sampling is conducted in year five, is $5,800.

PERFORMANCE STANDARDS OR GOALS: Metals and VOCs in the soil and ground water are not outside the range of metals and VOCs found naturally occurring in soil and ground water. Additionally, no MCLs are being exceeded in on-site or off-site drinking water wells.

INSTITUTIONAL CONTROLS: Not applicable.

CHEROKEE COUNTY/GALENA, KS
First Remedial Action
December 21, 1987

ROD ABSTRACT

The Cherokee County site, the Kansas portion of the Tri-State Mining District, is located in the extreme southeastern corner of Kansas. The Galena subsite, one of six subsites identified within the Cherokee County site, encompasses 18 square miles. The Galena subsite is characterized by surface mining waste features that impact the quality of the shallow ground water aquifer. This aquifer is a primary source of drinking water for approximately 1,050 people. Remains from past mining activity at the subsite include: large areas covered by mine and mill wastes, water-filled subsidence craters, and open mine shafts. EPA investigations of the Galena subsite conducted in 1986 and 1987 demonstrated that the shallow ground water aquifer and surface water are contaminated with elevated concentrations of metals. Due to the concern for the health of persons drinking this water, EPA Region VII conducted a removal action and installed water treatment units on these wells. This removal action was considered a temporary protective measure. The primary contaminants of concern observed in the private wells include: cadmium, lead, selenium, and zinc.

The selected remedial action for this site provides for collection of water from the aquifer through existing wells owned by the City of Galena with subsequent distribution of that water through a pipeline network to 418 houses, businesses, and farms outside of the Galena municipal water system but within the subsite. Additional capacity for the expanded system will be rehabilitated. If rehabilition becomes infeasible due to unforeseen on-site technicalities, a new deep aquifer well may be drilled to provide additional water. The remedy includes acquiring the construction and equipment necessary to setup a water supply to this area. The estimated present worth cost for this remedy is $5,300,000 with annual O&M of $100,000.

PERFORMANCE STANDARDS OR GOALS: Extracted ground water will be chlorinated prior to discharge and will meet the MCLs for cadmium 10 ug/l, lead 50 ug/l, selenium 10 ug/l, and zinc 5,000 ug/l.

INSTITUTIONAL CONTROLS: Existing institutional controls on municipal water supply systems are considered adequate.

JOHN DEERE DUBUQUE WORKS, IA
First Remedial Action - Final
September 29, 1988

ROD ABSTRACT

The John Deere Dubuque Works site is located approximately 2.5 miles north of the City of Dubuque, Iowa. The site is owned by Deere and Company, which has operated a manufacturing plant at the site since 1946. The plant property includes an area of 1,447 acres located in the flood plain at the confluence of the Little Maquoketa River and the Mississippi River. The waste management history of the plant is complex, but the primary area of concern is an unlined landfill originally placed in a natural depression caused by the Little Maquoketa River. Prior to 1968, wastes were placed in the low areas of the landfill and combustible materials were burned. Wastes included caustics (sodium or potassium hydroxide), acids (hydrochloric or sulfuric), petroleum distillates (solvents, grinding oils, and so forth), heavy metals (chromium, lead, zinc), cyanide, and paint sludges. Another area of concern at the facility is the site of a 1980 200,000-gallon diesel fuel spill. A diesel fuel recovery system involving an oil/water separator for non-aqueous phase liquids (NAPLs) was implemented that same year. Investigations conducted by John Deere indicated that human health hazards at the landfill could be considered minimal with the primary hazard being the possibility of dissolved organic chemicals impacting off-site domestic wells located east of the plant along the Mississippi River. Maintaining a minimum pumping rate of 1.2 mgd in the plant production wells will create sufficient drawdown to prevent migration of contaminated ground water to the off-site wells. The primary contaminants of concern affecting the ground water are VOCs including benzene, PCE, TCE, and toluene.

The selected remedial action for this site includes: development of an alternate potable water supply for the plant; extraction and off-site discharge of water from the contaminated alluvial aquifer using the existing production wells to maintain drawdown around the plant and landfill areas; continuation of extraction and treatment of NAPLs from production well No. 3 with off-site discharge of treated ground water and off-site disposal of collected NAPLs; imposition of deed restrictions to prevent inappropriate use of the plant property in the future; and development of a contingency plan to ensure that contaminants do not migrate off-site in the event of a plant shutdown (which would result in the loss of drawdown from production wells). The estimated present worth cost for this remedial action is $5,151,800 with annual O&M costs of $276,600.

PERFORMANCE STANDARDS OR GOALS: Recovery operations will continue until ground water quality meets Federal primary drinking water standards (MCLs) and EPA Health Advisories, and until the maximum recoverable amount of NAPL is withdrawn. Individual contaminant goals were not specified.

INSTITUTIONAL CONTROLS: Deed restrictions will be imposed to ensure that future use of the current plant property will be limited to industrial activities only, and that water wells tapping the alluvial aquifer beneath the property will not be allowed.

FULBRIGHT/SAC RIVER LANDFILLS, MO
First Remedial Action - Final
September 30, 1988

ROD ABSTRACT

The Fulbright and Sac River Landfills are located just north of the City of Springfield, Missouri, in a semirural area. The site is in the flood plain of the Little Sac River, and is owned by the City of Springfield, along with much of the surrounding land. Adjacent land use includes a police shooting range, an animal shelter, and an inactive wastewater treatment plant. The landfills were operated by the city for the disposal of municipal and industrial solid wastes. The Fulbright Landfill covered 98 acres and operated from 1962 through 1968. The Sac River Landfill, formerly known as the Murray Landfill, covered 114 acres and was in operation from 1968 through 1974. Generally, wastes (drummed or bulk) were disposed of in trenches and covered with soil. The City of Springfield and Litton Industries, Inc., agreed to conduct the RI and the FS under the oversight of EPA. Several leachate seeps have been noted, especially during wet weather. In addition to the landfill areas, another source of contamination was identified where a few dozen drums and waste residues were disposed of in a sinkhole on the bluff above the Fulbright Landfill. Based on data from the RI, environmental contaminant concentrations in soil, ground water, leachate, surface water, and sediments do not exceed applicable or relevant and appropriate requirement standards. The site, however, could endanger human health or the environment in the future through exposure of the industrial wastes through erosion of the landfill cover, installation of drinking water wells at or near the landfills, or from direct contact with leachate at the seeps. While a reference is made to disposal of cyanide and acid wastes, the primary contaminants of concern affecting the media investigated are not listed in the ROD.

The selected remedial action for this site includes: removal of the drum and drum remnants found in the sinkhole and associated trench east of the Fulbright Landfill; sampling the removed contents to determine hazardous characteristics; proper off-site treatment or disposal of removed contents; observation of the leachate seeps during maintenance (no action), ground and surface water monitoring for a 30-year maintenance period; and imposition of deed restrictions and ground water use prohibitions. The estimated present worth cost for this remedial action is $270,400 if wastes are disposed of as hazardous waste or $246,600 if disposed of as solid waste.

PERFORMANCE STANDARDS OR GOALS: Individual contaminant goals were not specified.

INSTITUTIONAL CONTROLS: Deed restrictions will be imposed on the city property containing the landfills.

HASTINGS GROUND WATER/COLORADO AVENUE, NE
First Remedial Action
September 28, 1988

ROD ABSTRACT

The Colorado Avenue subsite of the Hastings Ground Water Contamination site is located in the City of Hastings, Adams County, Nebraska. The Colorado Avenue subsite is a part of the Central Industrial Area which contains commercial and industrial properties situated along the Burlington-Northern railroad right-of-way. Residential properties are located immediately south and east of the site. Hastings industries used TCE at the site during the early to mid-1960s. From 1967 to May 1982 the site was used by Dravo Corporation for manufacturing of heating and air conditioning equipment. Metals were cleaned prior to finishing with a vapor-degreasing process, and waste solvents were discharged directly into the sanitary sewer and the storm sewer. The site has since been acquired by Marshalltown Instruments Company, that claims to have no involvement with disposal of the chemical contaminants. Ground water contamination was discovered when an out-of-service drinking water well was put back in service in 1983, resulting in complaints about the water quality. Subsequently, the Nebraska Department of Health and the Nebraska Department of Environmental Control began investigating widespread ground water contamination in the Hastings area. Active Hastings municipal water wells are located within one block, 3,000 feet, and 4,500 feet of the site, all three accessing a sole source aquifer. The highest levels of contamination of soil and soil-gas occur along the sanitary and storm sewers at the site with localized areas which correspond to joints in the sewers. The volume of contaminated soil is estimated to be 42,700 yd^3 and is the focus of this ROD. High levels of the contaminants are also found in the ground water beneath the site. The primary contaminants of concern affecting soil and ground water are VOCs, including TCE and PCE.

The selected remedial action for this site includes: in situ soil vapor extraction, utilizing vacuum extraction technologies; treatment of extracted vapor with an activated carbon system, if necessary; and implementation of an O&M program which includes soil, air, and ground water monitoring. Results of the ground water monitoring will be used to develop a technical approach for plume management and evaluate the need for ground water treatment in a subsequent ROD. The estimated present worth cost for this remedial action is $3,603,000, which includes a projection of annual O&M costs for the five year operating period. Long term O&M costs will depend on the success of the vapor extraction during the operating period.

PERFORMANCE STANDARDS OR GOALS: The initial source control effort is designed to control contaminant migration to the aquifer, therefore, no cleanup levels have been established. Cleanup effectiveness will be evaluated based on volumes of contaminants recovered from the soil.

INSTITUTIONAL CONTROLS: Not applicable.

HASTINGS GROUND WATER/FAR-MAR-CO, NE
First Remedial Action
September 30, 1988

ROD ABSTRACT

The FAR-MAR-CO subsite of the Hastings Ground Water site is located east of the City of Hastings, Adams County, Nebraska. The subsite is a part of an industrial enterprise zone which contains industrial properties situated along the Burlington-Northern railroad right-of-way. Residential properties are located immediately northwest of the site and agricultural lands are located east of the site. Historical and current use of the area has been for grain storage and railcar loading. The site is currently owned by Farmland Industries, Inc., that acquired the property through a merger with FAR-MAR-CO, Inc., in 1967. The current and previous owners used various chemicals on-site for fumigation of stored grain. Contamination was discovered when complaints about water quality were received by the Nebraska Department of Health (NDOH). Subsequently, the NDOH and the Nebraska Department of Environmental Control began investigating widespread ground water contamination in the Hastings area. Wells that are part of CMS, Inc., public supply system are located east and downgradient of the subsite. Contaminated soil at the subsite are believed to be the result of accidental spills and may be the direct result of a 1959 grain dust explosion which damaged a fumigation tank system, releasing 997 gallons of fumigant. The highest levels of contamination of soil and soil-gas occur in relatively small zones near the original grain elevator and adjacent to a large liquid fumigant bulk storage tank. The volume of contaminated soil is estimated to be 33,800 yd^3 and is the focus of this ROD. High levels of the contaminants are also found in the ground water beneath the site. The primary contaminants of concern affecting soil and ground water are carbon tetrachloride and ethylene dibromide (EDB).

The selected remedial action for this site includes: in situ soil vapor extraction, utilizing vacuum extraction technologies; treatment of extracted vapor with an activated carbon system, if necessary; access restrictions; and implementation of an O&M program which includes soil, air, and ground water monitoring. Results of the ground water monitoring will be used to develop a technical approach for plume management and evaluate the need for ground water treatment in a subsequent ROD. The estimated present worth cost for this remedial action is $2,526,000, which includes a projection of annual O&M costs for the five year operating period. Long-term O&M costs will depend on the success of the vapor extraction during the operating period.

PERFORMANCE STANDARDS OR GOALS: This initial source control effort is designed to control contaminant migration to the aquifer, therefore no cleanup levels are established. Cleanup effectiveness will be evaluated based on volumes of contaminants recovered from the soil.

INSTITUTIONAL CONTROLS: Not applicable.

MIDWEST MANUFACTURING/NORTH FARM, IA
First Remedial Action
September 30, 1988

ROD ABSTRACT

The North Farm operable unit is one of two subsites of the Midwest Manufacturing site and is located in a rural area approximately two miles north and one-half mile east of Kellogg, Jasper County, Iowa. Approximately 600 people live in Kellogg. Land use near the site is mainly agricultural, with pasture land on and around the site. The closest residence to the North Farm subsite is approximately one mile from the site. The subsite consists of an unlined disposal cell containing approximately 200 yd^3 of soil contaminated with electroplating wastes. The disposal cell is located on the lower slope of a rolling hill adjacent to the valley of Bear Creek, which is an intermittent stream located 500 feet east of the site. Bear Creek lies 50 feet lower than the site. Records indicate that electroplating activities took place at this site prior to 1979 and ceased operations in June 1981. Activities involved the use of various heavy metals, including cadmium, nickel, and zinc, as well as cyanide. In 1977, a wastewater treatment plant was installed at the facility to treat the plant effluent before it was discharged into the North Skunk River. Solids generated at the treatment plant were temporarily stored in a tank on-site and periodically transferred to the disposal cell. The disposal cell was unlined and had no soil cap, leachate collection system, or run-on and run-off controls. Soil sampling was conducted on-site and downslope in 1982 and 1983 to evaluate the potential for off-site contaminant migration due to previous waste disposal practices. Analysis of the samples revealed that soil contamination had occurred via surface run-off. The primary contaminants of concern affecting the soil are cadmium and cyanide.

The selected remedial action for this operable unit includes: excavation of cadmium-contaminated soil within and around the disposal cell with either on-site or off-site soil treatment including stabilization, and off-site disposal of the treated soil at a permitted RCRA Subtitle C disposal facility; and backfilling and grading of the excavated area with clean soil to support a vegetative cover. The estimated total present worth cost for this remediation is $140,000 - $170,000. The remedial action for the Midwest Manufacturing operable unit of this site will be addressed in a subsequent ROD.

PERFORMANCE STANDARDS OR GOALS: Contaminated soil will be excavated to less than the health-based action level of 13 mg/kg for cadmium. Treated soil will meet the treatment standards specified in the Land Disposal Restrictions for F006 non-wastewaters and will be measured as a leachate contaminant concentration using the TCLP. The treatment standards are cadmium 0.066 mg/L, total chromium 5.2 mg/L, lead 0.51 mg/L, nickel 0.32 mg/L, and silver 0.072 mg/L.

INSTITUTIONAL CONTROLS: Not applicable.

MINKER/STOUT/ROMAINE CREEK, MO
Second Remedial Action
September 29, 1988

ROD ABSTRACT

The Minker/Stout/Romaine Creek (M/S/RC) site is located in the city of Imperial, Jefferson County, Missouri, 25 miles southwest of St. Louis. The site is an unincorporated, wooded residential area and is comprised of four noncontiguous areas: Minker, Stout, Cashel, and Sullins. It is within a distance of approximately 0.8 miles and includes the upper 6000 feet of Romaine Creek. Contamination at the site resulted from the use of dioxin-contaminated soil as fill material, and has spread as a result of erosion from these areas. Contaminated soil in all areas except the Stout area and Romaine Creek has been excavated and currently is stored in interim on-site storage. The total volume of contaminated soil at this site including the amount in temporary storage is estimated to be 12,000 cubic yards. The primary contaminant of concern affecting the soil at this site is 2,3,7,8-TCDD (dioxin).

The selected remedial action for this site includes: excavation of soil exceeding 20 ppb dioxin and off-site thermal treatment and incinerator ash disposal at the Times Beach site, placing of clean soil cover and revegetation over all areas with residual dioxin levels between 1 and 20 ppb, and off-site thermal treatment and incinerator ash disposal at the Times Beach site of contaminated soil held in interim storage. The estimated total capital cost for this remedial action is $48,800,000, which includes all costs from the Times Beach site.

PERFORMANCE STANDARDS OR GOALS: Soil cleanup levels will attain a 1 ppb dioxin level at the ground surface and a 5 to 10 ppb dioxin level at a depth of one foot or greater. Thermal treatment will attain (99.9999 percent) destruction and removal efficiency of dioxin from soil.

INSTITUTIONAL CONTROLS: Institutional controls will be established to control future land use and to prevent future residential development.

SHENANDOAH STABLES, MO
First Remedial Action
July 28, 1988

ROD ABSTRACT

The Shenandoah Stables (SS) site is located in a rural area near Moscow Mills, Lincoln County, Missouri, approximately 35 miles northwest of St. Louis, Missouri. The property includes an enclosed arena and horse stables. There are about 8 residences located within a 0.5 mile radius of the site, as well as a livestock operation and other small businesses on approximately 5- to 10-acre parcels around the facility. The site lies in the upper flood plain of Crooked Creek. In May 1971, the area inside the arena was sprayed with dioxin-contaminated waste oil for dust control purposes. There are reports that 1,500 gallons of waste material were applied at this time. Following this spraying, a number of adverse effects were noted: horses and other animals became ill or died, and the six-year-old daughter of one of the owners was hospitalized for a variety of symptoms assumed to be related to exposure to contaminated soil. Between August 1971 and March 1972, approximately 24 to 26 inches of the contaminated material was removed and disposed of either off-site or on-site in two removal episodes. Investigations were conducted by EPA in May 1982, which indicated continued exterior and interior contamination of the facility by dioxin at levels greater than 1,750 ug/kg. Since the spraying, the site has been flooded a number of times, with water levels inside the arena as high as four feet above the arena floor. Investigations have shown contamination of approximately 8,600 yd^2 of interior and exterior site areas. The primary contaminant of concern affecting the soil and structures at the site is dioxin.

The selected remedial action for this site includes: excavation of all dioxin-contaminated surface soil exceeding 1 ug/kg with continued excavation until a residual concentration of 5 to 10 ug/kg at the 2 to 4-foot depth is reached in the arena and slough; or, excavation until bedrock is encountered, with backfilling of excavated area, placement of the excavated soil in lined polypropylene bags, and storage of the bags in RCRA-equivalent enclosed steel storage structures on-site; and decontamination of on-site structures. Approximately 3,300 yd^3 of soil are expected to be excavated and stored. The estimated present worth cost for this remedial action is $3,936,500.

PERFORMANCE STANDARDS OR GOALS: Excavation of surface soil exceeding 1 ug/kg dioxin, and 5 to 10 ug/kg at a 2-foot depth in the arena or 1-foot depth in other areas, to a maximum 4-foot depth or to bedrock based on health-based action levels provided by ATSDR.

INSTITUTIONAL CONTROLS: The arena and stables are to be closed and access to the property will be restricted.

SYNTEX VERONA, MO

First Remedial Action - Final
May 5, 1988

ROD ABSTRACT

The Syntex Verona (SV) site, formerly operated as Hoffman-Taff Inc., was purchased in 1969 by Syntex Agribusiness. The site is located 30 miles southwest of Springfield in extreme southwestern Missouri. Approximately 500 people live in Verona, Missouri, which borders on the site. The site area encompasses approximately 180 acres along the east bank of the Spring River. The majority of the active portion of the facility is located within the Spring River 100-year flood plain. SV was used to manufacture hexachlorophene from 1970 to 1971 and produced the byproduct 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), referred to as dioxin. From 1971 to 1988, EPA and Syntex Verona conducted numerous site investigations. The findings showed contamination both on- and off-site which may be related to the former activities at the site. The major areas identified as being contaminated are the Slough Area, Lagoon Area, Spill Area/Irrigation Area, Burn Area, and Trench Area. Dioxin contamination ranged from 1 ug/kg to 1,380 ug/kg, with the maximum concentrations occurring in the Lagoon Area. In addition to dioxin contamination, other organics and inorganic compounds were identified. The concentrations of these compounds were below the level of concern for human health. The primary contaminant of concern affecting the soil is dioxin.

The selected remedial action for this site includes: excavation and off-site thermal treatment of dioxin-contaminated soil exceeding 20 ug/kg and off-site disposal of the ash residue, dismantling and decontamination of equipment with a series of solutions and aqueous rinses, installation of a clay cap with a vegetation cover over the Trench Area; and maintenance of vegetation cover over surface soil containing levels of dioxin from 1 ug/kg to 20 ug/kg. The estimated present worth cost for this remedial action is $5,617,000.

PERFORMANCE STANDARDS OR GOALS: A site-specific action level of 20 ug/l has been established as an appropriate cleanup level for dioxin-contaminated soil.

INSTITUTIONAL CONTROLS: Not applicable.

TIMES BEACH, MO
Second Remedial Action
September 29, 1988

ROD ABSTRACT

The Times Beach site is a 0.8 square-mile area located in the formerly incorporated city of Times Beach, St. Louis County, Missouri, approximately 20 miles southwest of the city of St. Louis. The site is bordered on the north and east by the Meramec River and areas of St. Louis County, on the south by areas of Jefferson County, and on the west by the City of Eureka. Land use of the surrounding areas is primarily residental and agricultural. The majority of the site falls within the five-year flood plain and the entire site falls within the 25-year flood plain of the Meramec River. The soil contamination at the site is a result of spraying roads for dust control in the 1970s with oil that was contaminated with dioxin. Investigations indicate that the contamination is limited to the roads, road shoulders, and drainage ditches along the roads and is generally limited to the top twelve inches of the soil. Approximately 13,600 cubic yards of soil at concentrations above 20 ppb dioxin as well as 105,000 cubic yards of structures and debris are estimated to be contaminated. No detectable levels of dioxin have been found in the ground water or surface water at the site thus far. Based on the analytical results of soil samples collected in 1982, and on an advisory from the Centers for Disease Control, EPA determined that all residents and businesses should be relocated. In February 1983, EPA transferred CERCLA funds to the Federal Emergency Management Agency to conduct relocation activities. The primary contaminant of concern affecting the soil at this site is 2,3,7,8-TCDD (dioxin).

The selected remedial action for the site includes: demolition and on-site disposal of all structures and debris remaining at the site, excavation of dioxin-contaminated soil exceeding 20 ppb, and thermal treatment in a temporary on-site thermal treatment unit with on-site disposal of incinerator ash, placing of clean soil cover and revegetation over all areas with residual dioxin levels between 1 and 20 ppb, construction of a ring levee surrounding the temporary thermal treatment unit for flood protection, interim storage of excavated soil on-site pending availability of the thermal treatment unit, and implementation of erosion controls. The estimated total capital cost for this remedial action is $48,800,000, which includes all costs from the Minker/Stout/Romaine Creek site.

PERFORMANCE STANDARDS OR GOALS: Soil cleanup levels will attain a 1 ppb dioxin level at the ground surface and a 5 to 10 ppb dioxin level at a depth of one foot or greater. Thermal treatment will attain (99.9999 percent) destruction and removal efficiency of dioxins from soil.

INSTITUTIONAL CONTROLS: Institutional controls will be established to control future land use and to prevent future residental development.

ANACONDA SMELTER/MILL CREEK, MT
First Remedial Action
October 2, 1987

ROD ABSTRACT

The 160-acre community of Mill Creek is located in Deerlodge County, Montana, immediately adjacent to the Anaconda Smelter NPL site. The community of Mill Creek has been contaminated for over 100 years with smelter emissions, fugitive emissions of flu dust at the smelter, and continued fugitive emissions emanating from adjacent highly contaminated soils. Settled flue emissions in the community of Mill Creek, from the now defunct copper smelting operation, contain arsenic, cadmium, and lead. Environmental testing of the community, and biological testing of pre-school children led EPA to conclude that contamination in the Mill Creek area poses an imminent and substantial endangerment to the health of individuals residing there. In combination with future operable units for Mill Creek, the goal of this interim remediation is to provide adequate permanent protection for the health of current residents and interim protection for future short-term visitors to the area. The primary contaminant of concern at this site is arsenic. Cadmium and lead are secondary contaminants of concern.

The selected remedial action for this site includes: permanent relocation of all residents (8 homes), with temporary erosional stabilization of disturbed areas by establishing and maintaining a vegetative cover; demolition, consolidation, and temporary on-site storage of debris; fencing and posting of the entire site; and implementation of site access and deed restrictions. The estimated present worth cost for this remedial action is $300,000.

PERFORMANCE STANDARDS OR GOALS: Risk-based performance goals for arsenic and cadmium were less than background levels and appear technically unattainable. Therefore, background levels for arsenic 0.01 ug/m^3 and cadmium 0.01 ug/m^3 will be met. The NAAQS for lead 1.5 ug/m^3 also will be met.

INSTITUTIONAL CONTROLS: Institutional controls will be implemented to control site access and future land use.

BRODERICK WOOD PRODUCTS, CO
First Remedial Action
June 30, 1988

ROD ABSTRACT

The Broderick Wood Products Company (BWP) site, is located in Adams County, Colorado, and encompasses approximately 64 acres. It is situated in a primarily industrial area and is bounded on the southwest and southeast by railroad tracks and on the north by Fisher Ditch. The site is one-half mile south of Clear Creek, a perennial stream. The nearest residences are less than one-eighth of a mile north of the property line. Major site features include two surface impoundments and a total of 19 buildings and structures. Between 1947 and 1981, BWP operated a wood treatment facility to treat power poles, fence posts, railroad ties, and other wood products. Process wastes from the plant were conveyed through a clay pipe to the two on-site, unlined surface impoundments, referred to as the main and secondary impoundments and located in the northwest corner of the facility. Records indicate that waste seepage was apparent just north of the site and became so extensive that the waste was burned off, starting in 1955. Records also indicate that four additional ponds were periodically utilized. In August 1980, BWP submitted a RCRA permitting application and obtained interim status to operate its facility but ceased operations in November 1981. Site investigations conducted by EPA in April 1981 and July 1982 noted several violations of RCRA requirements. Another site inspection in December 1982 revealed the possibility of serious contamination at a trench in the vicinity of the surface impoundments that reportedly had only been used for the disposal of solid waste. A black stain and oily puddle were noted at the bottom of the trench. Wood treating chemicals also were detected in a ground water monitoring well located immediately downgradient of the surface impoundments. A source of contamination at the site that will be addressed in this remedial action is a result of a fire in July 1985 that damaged the treatment plant building. Water used to fight the fire was contaminated with asbestos fibers from the building insulation. This contaminated water was pumped to on-site holding vessels and some still remains in the basement of the building. The main and secondary impoundments have been identified as the major sources of site contamination. The main impoundment contains a surface layer of oil and grease, a water layer, and a sludge layer. The secondary impoundment contains primarily a sludge layer. The quantity of sludge from the two impoundments is estimated to be approximately 4000 yd^3 and is designated as RCRA K001 hazardous waste. Approximately 31,000 yd^3 of contaminated soil is estimated to be below the impoundments. The primary contaminants of concern from the impoundments affecting the soil and ground water are VOCs including benzene, organics including PAHs, PCPs, dioxins, and metals including lead.

The selected remedial action for this site includes: installation of access restrictions; excavation and on-site mobile incineration of the sludge and oil in the main and the secondary impoundments, with off-site disposal of the residual ash; treatment of contaminated impoundment wastewater using carbon adsorption with disposal through on-site evapo-transpiration or use as incinerator quench water; excavation of the visibly contaminated soil beneath the impoundments, and on-site incineration if the volume is less than 2,500 yd^3, or on-site storage for further studies, if the volume is greater than 2,500 yd^3; filtration of water from the facility area to remove asbestos fibers, and treatment using carbon adsorption, with disposal through on-site evapo-transpiration or use as incineration quench water; and ground water monitoring. The estimated present worth cost for this remedial action ranges between $2,264,000 and $3,603,200.

PERFORMANCE STANDARDS OR GOALS: Cleanup goals will meet specified BDAT levels for RCRA K001 sludge as determined by testing the incinerator ash to ensure that concentrations do not exceed the following levels: zinc 0.066 mg/l (TCLP), lead 0.53 mg/l (TCLP), copper 0.71 mg/l (TCLP), xylenes 0.162 mg/kg, toluene 0.143 mg/kg, pyrene 7.28 mg/kg, phenanthrene 7.98 mg/kg, PCP 36.75 mg/kg, and napthalene 7.98 mg/kg. Wastewater contaminants will be treated to non-detectable levels to comply with State standards. If these levels cannot be met, State standards will be waived and contaminants will be treated to MCLs.

INSTITUTIONAL CONTROLS: Not applicable.

CALIFORNIA GULCH, CO
First Remedial Action
March 29, 1988

ROD ABSTRACT

The California Gulch site is located in Lake County, Colorado, approximately 100 miles southwest of Denver. The study area for this first remedial action encompasses an 11.5 m^2 watershed, which includes the city of Leadville, and which drains along California Gulch to the Arkansas River. Between 1859 and 1986, the area was extensively mined for gold, lead, silver, copper, zinc, and manganese. Because of these mining operations, the Yak Tunnel was constructed to de-water mines and facilitate mineral exploration and development. Studies indicate that the Yak Tunnel discharges a combined total of 210 tons per year of cadmium, lead, copper, manganese, iron, and zinc into California Gulch, which drains into the Arkansas River. Both California Gulch and the Arkansas River are used by the public for recreation; the Arkansas River is heavily used for irrigation, livestock watering, public water supply, and fisheries as well. Surface water contamination is the major impact of the Yak Tunnel discharge. Heavy metal migration through surface water has also caused ground water and sediment contamination. Primary contaminants of concern affecting the surface water, sediments, and ground water are cadmium, copper, lead, and zinc.

The selected remedial action for this site includes: construction of surge ponds at the portal of Yak Tunnel to protect the California Gulch site and the Arkansas River from accidental release of acid water, sludge, and sediments; construction of concrete plugs at locations in the tunnel to reduce migration of contaminated water and reduce the extraction of metals from raw mineral ore; sealing shafts and drill holes, diversion of surface water away from tunnel recharge areas, and grouting of highly fractured rock; implementation of a monitoring program to detect leaks, seeps or migration of contaminated ground water; and installation of an interim treatment plant to treat ground water, which will be pumped to control surface seeps and migration of contaminated surface water. The estimated capital cost of the selected remedy is $11,982,770 with annual O&M costs of $460,307.

PERFORMANCE STANDARDS OR GOALS: This operable unit invokes an interim remedy waiver. Because of other sources affecting surface water contamination, the remedy does not expect to attain chemical-specific cleanup goals for surface water. Response actions in subsequent operable units, in combination with this remedy, will attain a level or standard of control at least equivalent to ARARs.

INSTITUTIONAL CONTROLS: Not applicable.

CENTRAL CITY/CLEAR CREEK, CO
Second Remedial Action
March 31, 1988

ROD ABSTRACT

The Clear Creek/Central City site is located approximately 30 miles west of Denver in Clear Creek and Gilpin Counties, Colorado. The site consists primarily of acid mine drainages from five mines/tunnels and adjacent milling and mining wastes. Currently, acid mine drainage, and runon and runoff from the tailings and waste rock piles have affected downstream surface water quality. In addition to the direct discharge from the mine tunnels, contaminated water may enter Clear Creek and North Clear Creek during overland sheet flow. This occurs during rapid snowmelt and storms. The resulting surface flow across the tailings and waste rock piles dissolves soluble minerals and transports particulate tailings and waste rock materials into the creeks. All this results in elevated creek acidity and metal loads. The introduction of tailings and waste rock into the creeks could also occur due to catastrophic collapse of tailings and waste rock piles during a flash flood, or as a result of undercutting of the base of the pile under any flow regimen. The discharges from the five tunnels were addressed in the first remedial action operable unit for this site. The primary contaminants of concern for human receptors in surface water include: aluminum, arsenic, cadmium, chromium (IV), lead, manganese, nickel, and silver. For aquatic receptors, the above list expands to include: copper, fluoride, and zinc.

The selected remedial action for this site includes: slope stabilization at the Big Five Tunnel and Gregory Incline; monitoring of the gabion wall at the Gregory Incline; and run-on control at the Argo Tunnel, Big Five Tunnel, Gregory Incline, National Tunnel, and the Quartz Hill Tunnel. The estimated present worth cost for this remedial action is $1,049,600.

PERFORMANCE STANDARDS OR GOALS: The selected interim remedy requires the exercise of the "interim remedy" from the contaminant-specific ARARs listed in the FS.

INSTITUTIONAL CONTROLS: Not applicable.

INDIAN BEND WASH, AZ
First Remedial Action
September 21, 1988

ROD ABSTRACT

The Indian Bend Wash site (IBW) encompasses 13 square miles in Scottsdale and Tempe, Arizona. The portion of the site addressed in this remedial action, the Scottsdale Ground Water Operable Unit, covers approximately eight square miles within the Scottsdale city limits. The Indian Bend Wash, a flood protection mechanism, runs north - south through the site and supports recreational uses. Ponds in the wash are used as a water collection system. The land use of this area is primarily residential with approximately 30 percent used for commercial, light industrial, and developed recreational purposes. The resident population of Scottsdale was 115,500 in 1986, and is expected to reach 129,500 by 1990. Approximately 70 percent of the City of Scottsdale's municipal water currently is supplied by ground water. Future population growth will require greater use of ground water resources, particularly from the contaminated areas. In 1981, TCE was discovered in the ground water from several City of Scottsdale and City of Phoenix municipal wells at concentrations exceeding the Arizona Department of Health Services action levels. Several facilities within the site boundaries have records of past use of TCE in their manufacturing process. Seven of the 12 city wells within the boundaries of this operable unit have levels of VOCs exceeding primary drinking water standards. One of the seven is equipped with a VOC treatment facility and is used as a potable water supply source. The other six wells are currently off-line. The site was placed on the NPL in 1982. The primary contaminants of concern affecting the ground water are VOCs including TCE and PCE.

The selected remedial action for this operable unit of the site includes: extraction of ground water by pumping City of Scottsdale Wells No. 31, 71, 72, and 75 at a minimum of 75 percent of their historical capacities; treatment of ground water using packed column aeration to transfer the VOCs from the water to air, with vapor phase GAC adsorption to remove VOCs from the air waste stream; and distribution of the treated water to the City of Scottsdale municipal water system. This remedial action addresses ground water contamination only in the Middle and Lower Alluvium Units beneath the north portion of IBW within the Scottsdale City limits. Contamination beyond these limits in the ground water of the Upper Alluvium limit and in the soil will be addressed in subsequent remedial actions for the IBW site. The estimated total capital cost for this operable unit is $4,008,000 with an estimated annual O&M cost of $520,000.

PERFORMANCE STANDARDS OR GOALS: Treatment of the ground water will reduce contamination to levels below MCLs and State action levels. Specific treatment goals include TCE 5 ug/l (MCL), TCA 200 ug/l (MCL), DCE 7 ug/l (MCL), and PCE 0.67 ug/l.

INSTITUTIONAL CONTROLS: Not applicable.

LORENTZ BARREL & DRUM, CA
First Remedial Action
September 25, 1988

ROD ABSTRACT

The 5.4-acre Lorentz Barrel & Drum (LB&D) site is located in San Jose, California, about 0.25 mile from San Jose State University. The site lies directly above a major source of potable ground water in the south San Francisco Bay area, with three public water supply well fields within one mile of the site. In 1947 the Lorentz family began a drum recycling operation on 10.5 acres of land at the site. Currently, 4.5 acres are capped with tar and gravel but contain stored drums; 0.75 acre includes the reconditioning facilities. Drums containing residual aqueous wastes, organic solvents, acids, oxidizers, caustic residues, and oils were received for recycling. During the early years of operation, portions of the site were also leased to other companies. Between 1950 and 1978, a drainage ditch north of the drum processing building carried process wastes to a large sump and other ponding areas on-site. Prior to 1968, wastes from the sump were discharged to a storm drain system. Sometime between 1968 and 1971, the discharge was diverted to a sanitary sewer, and investigations indicate that this discharge occurred until 1984. After this time, liquid wastes were evaporated, drummed, and disposed of as hazardous waste along with incinerator ash, residual liquids, and sludge. Subsequent surface run-off was collected and recycled in the hot caustic drum wash. Since 1981, several investigations have revealed soil and ground water contaminated with numerous metals, organics, and PCBs. Removal of drums, stored hazardous materials, and highly contaminated soil has been conducted at the site. This remedial action will address the off-site contaminated shallow ground water. On-site contaminated soil, and additional shallow and deep ground water remediation will be addressed in a subsequent remedial action. The primary contaminants of concern affecting soil and ground water are VOCs, including benzene, PCE and TCE, other organics including PCBs and pesticides, and metals including arsenic and nickel.

The selected Expedited Response Action for this site includes: on-site ground water pump and treatment using ozone/UV for organic removal and ion exchange for nickel removal, with discharge of treated water to a local creek. The estimated present worth cost for this remedy is $3,238,000 with annual O&M costs of $198,000.

PERFORMANCE STANDARDS OR GOALS: Treatment of ground water will attain levels at or below MCLs and NPDES discharge limit requirements. Specific treatment levels include: benzene, PCE, and TCE 5.0 ug/l (MCLS), PCBs 0.065 ug/l, and arsenic 0.23 ug/l. PCBs and pesticides will be removed to detection limits.

INSTITUTIONAL CONTROLS: Not applicable.

MGM BRAKES, CA
First Remedial Action-Final
September 29, 1988

ROD ABSTRACT

The MGM Brakes site consists of a five-acre plot containing an automotive brakes casting plant, a paved area surrounding the plant, and an open field. It is located in the city of Cloverdale, California, in Alexander Valley, approximately 80 miles north of San Francisco. Forty homes, an apartment complex, a church, an animal grazing area, and several construction companies exist within a half-mile radius of the site. In addition, a 200 unit housing development is under construction immediately adjacent to the site. Surface water drainage from the site flows into Icaia Creek which flows into the Russian River. From 1965 until 1972, wastewater containing PCBs was discharged onto site property. Wastewater containing ethylene glycol was disposed on-site between 1972 and 1981. The ethylene glycol acted as a co-solvent with water, facilitating the transport of PCBs in soil. Approximately 13,510 yd^3 of soil within a 3-acre area have been contaminated with PCBs at concentrations up to 4500 ppm. The majority of contamination is present at depths of less than 5 feet (although contamination to 29 feet was found in one area). In addition, VOCs have been detected in ground water from wells on and near the site. However, the source of this contamination is unknown. The primary contaminants of concern affecting ground water are VOCs including TCE and benzene. The primary contaminants of concern affecting soil, sediments, surface water, and air are PCBs.

The selected remedial action for this site includes: dismantling of the MGM Brakes process building; crushing of concrete slab, and excavation of soil and of contaminated sediments in the drainage ditch containing PCBs at levels greater than or equal to 10 mg/kg, with disposal in an off-site California regulated Class II landfill if below 50 ppm and a TSCA-approved landfill if above 50 ppm; determination and removal of VOC-contaminated soil and off-site RCRA disposal; treatment of dewatered ground water for PCBs and VOCs through use of an on-site mobile treatment unit and discharge to a publicly owned treatment works (POTW); soil replacement, regrading, compaction, and revegetation; off-site ground water monitoring to determine extent of VOC contamination; and development of additional remedial measures, if warranted. The estimated capital cost for this remedial action is $5,369,300 with no annual O&M costs.

PERFORMANCE STANDARDS OR GOALS: Soil containing greater than or equal to 10 mg/kg PCBs (equal to 10^{-5} cancer risk) will be removed. Ground water will be restored to MCL or other health-based levels such that the total risk from VOC contamination at the site boundary does not exceed 10^{-6}. Discharge levels of treated ground water to the local POTW will meet the requirements of the California North Coast Regional Water Quality Control Board's Water Quality Control Plan.

INSTITUTIONAL CONTROLS: Implementation of institutional controls is not necessary because the selected remedy will not result in hazardous substances remaining on-site above health-based levels.

MOTOROLA 52ND STREET, AZ
First Remedial Action
September 30, 1988

ROD ABSTRACT

The Motorola 52nd Street site is located in the eastern part of the City of Phoenix, Maricopa County, Arizona. The site is bounded by the Phoenix Military Reservation and mixed residential and commercial neighborhoods. The site is currently owned by Motorola, Inc., which operates a manufacturing facility at the site using solvents for various manufacturing processes. In January 1983, Motorola tested some underground storage tanks used to store virgin solvents for leaks and determined that a 5,000-gallon tank containing TCA was leaking. Subsequently, Motorola conducted a preliminary investigation, which indicated soil and ground water contamination on the plant site and ground water contamination off-site to the west. Motorola initiated an on-site ground water treatment program in 1986, which included treatability testing, design, and installation of a Pilot Treatment Plant (PTP), treatment of ground water, and beneficial use of the effluent in the plant's air fume scrubbers. The PTP is still in operation. The selected remedy for this ROD requires partial cleanup of on-site and off-site organic solvents contamination in the soil and alluvium groundwater. A subsequent remedial action will address cleanup of all on-site and off-site contamination in the soil, alluvium ground water, and the bedrock underlying the alluvium. The primary contaminant of concern affecting the soil and ground water is TCA.

The selected remedial action for this site includes: on-site soil-gas extraction and treatment using granular activated carbon systems; pump and treatment of on- and off-site ground water with treatment on-site and use of the treated ground water in site manufacturing processes; and ground water monitoring. The estimated present worth cost for this remedial action is $7,600,000 with annual O&M costs of $700,000.

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup will meet relevant State and Federal standards including Maricopa County Pollution Control discharge standards. Individual contaminant goals were not specified.

INSTITUTIONAL CONTROLS: Not applicable.

OPERATING INDUSTRIES, CA
Second Remedial Action
November 16, 1987

ROD ABSTRACT

The Operating Industries, Inc., (OII) site is a 190-acre landfill located in Monterey Park, California. The City of Montebello borders the southern parcel of the landfill and has a population of 52,929 residents. Several residences are located immediately adjacent to the landfill boundaries. Between 1948 and 1984, the landfill was used for the disposal of municipal and industrial waste (some of which would currently be classified as hazardous waste). Between 1976 and 1983, the landfill was permitted to receive liquid hazarous waste and accepted over 200 million gallons of manifested liquid waste. Over its 36-year life span, the OII landfill has accepted several types of waste including: residential and commercial refuse; water-insoluble, nondecomposable inert solids; liquid wastes; various hazardous wastes including waste water treatment sludge from production of chrome oxide green pigment; and slop oil emulsion solids and tank bottom sludges (leaded) from petroleum refining operations. Both landfill gas and leachate are generated at the OII site. Several gas and leachate collection systems were constructed by the owners of OII during the early 1980s to partially control landfill gas and prevent surface seepage of leachate. GSF, Inc., also constructed a commercial methane recovery system at the site and began extracting gas from the landfill for processing and sale in 1979. Leachate was redisposed at the landfil until October 1984; since then, collected leachate has been stored in tanks on-site and transported to a permitted off-site treatment facility. The collected leachate contains VOCs. EPA took over day to day operations and maintenance of the site and existing site systems as an emergency response action in May 1986. EPA has conducted a number of the emergency actions to mitigate some of the potential threats to public health and the environment which are posed by the site. GSF, Inc., abandoned their gas extraction operations in the spring of 1987, and EPA has operated the GSF system since that time. In July 1987, EPA signed a Record of Decision addressing site control and monitoring activities, which have since been conducted by EPA as a remedial action. This ROD is designed to address the approximately 10,000 gallons of leachate that are expected to be collected before implementation of a final site remedy. The leachate generated contains VOCs including benzene, TCE, toluene, and vinyl chloride.

The selected remedial action for this site includes: on-site treatment of leachate and other collected hazardous liquids by air stripping and granular activated carbon adsorption in a facility constructed at on-site location B, with discharge to the Los Angeles County Sanitation District sewerage system for treatment at a POTW. The estimated five-year capital cost for this remedial action is $1,900,000 with estimated five-year annual O&M of $700,000.

PERFORMANCE STANDARDS OR GOALS: Leachate will be treated to achieve the 10^{-6} health-based Los Angeles County Sanitation District (LASCD) Industrial Discharge Requirements. Individual effluent discharge limits include: arsenic 3.0 mg/l, chromium 2.77 mg/l, copper 3.38 mg/l, zinc 2.61 mg/l, oil and grease 10.0 mg/l, total toxic organics 1.0 mg/l, and vinyl chloride 15 ug/l.

INSTITUTIONAL CONTROLS: Not applicable.

OPERATING INDUSTRIES, CA
Third Remedial Action
September 30, 1988

ROD ABSTRACT

The Operating Industries Inc. (OII) site is a 190-acre landfill located in Monterey Park, California, 10 miles east of Los Angeles. Northwest and east of the site the land use is primarily industrial; residential units are located to the southwest, east, and west of the site. There are approximately 53,000 residences within a three-mile radius of the site. Available data indicate that 2,150 people live within 1,000 feet of the landfill. Disposal activities at the site began in October 1948 by the Monterey Park Disposal Company (MPDC) who used the site as a municipal landfill on behalf of the City of Monterey Park. In 1952, the site and additional land, totalling 218 acres, were purchased by OII. The landfill was permitted to accept household refuse, organic refuse, scrap metal, non-decomposable inert solids, and certain types of liquids. In 1964, the State of California purchased 28 acres of the land owned by OII to construct the Pomona Freeway, which divided the site into two sections. In 1975, Monterey Park City limited solid waste disposal to a 130-acre section of the landfill and a year later restricted disposal of liquids to a 32-acre section of the landfill. In April 1983, OII ceased accepting all liquid wastes; disposal of all solid wastes ended in October 1984. EPA currently is performing operation and maintenance of the existing leachate collection system, perimeter gas extraction system, and interior gas extraction system. This remedial action addresses only the issue of landfill gas (LFG) migration control and destruction. Final cover, leachate collection, ground water and soil contamination, slope stability, and final closure will be addressed in subsequent remedial action. The primary contaminants of concern affecting the air are methane and VOCs including benzene, PCE, TCE, and toluene.

The selected remedial action at the site includes: installation of perimeter LFG extraction wells, pile-driven wells on the top deck of the landfill, shallow and deep slope wells to control intermediate-to-deep subsurface migration at the perimeter, and integrated perimeter and interior LFG headers; utilization of existing gas extraction wells and gas monitoring probes; installation of multiple completion monitoring wells at the property boundary, landfill gas destruction facilities and an automated control station for the gas control system; and installation of abovegrade condensate sumps to collect condensate from gas headers, leachate pumps in gas wells to de-water saturated zones, and abovegrade leachate sumps. The selected remedial action for the North Parcel system includes: installation of six single completion extraction wells to the depth of the refuse and installation of 1,500 feet of header lines. The estimated present worth for this remedial action is $73,000,000 with an annual O&M cost of $2,340,000.

PERFORMANCE STANDARDS OR GOALS: This remedy will attain State-required levels for vinyl chloride ambient concentrations of 10 ug/l over a 24-hour period, carbon monoxide emissions of 2,000 mg/l, and sulfur dioxide emissions of 500 mg/l. The risk of fire or explosion due to landfill gas accumulating off-site will be eliminated by controlling methane concentrations to less than five percent of the landfill boundary. The leachate and condensate that will be collected from the gas control system will be treated to levels established by the POTW pretreatment requirements.

INSTITUTIONAL CONTROLS: Not applicable.

ORDOT LANDFILL, GU
First Remedial Action - Final
September 28, 1988

ROD ABSTRACT

The Ordot Landfill site is located on the Island of Guam. The landfill is in a volcanic upland region, where site runoff flows directly into the adjacent Lonfit River. Water wells have not been drilled in the volcanics near the landfill. There is concern, however, that a suspected fault near the landfill may provide a hydrologic connection between the contaminants at Ordot Landfill and Guam's major drinking water acquifer located in the northern limestone province of Guam. The landfill is presently managed and operated by the Guam Department of Public Works, and has been receiving uncontrolled municipal wastes since before World War II. Because it is the only major public waste disposal site on Guam, it has received some hazardous waste during its history, including spent industrial and commercial chemicals, PCB-contaminated oils from transformers, and perhaps munitions. The facility uses almost the entire 47-acre waste disposal area, with only approximately 4 to 7 acres of the oldest portion of the landfill not currently in use. The current depth of disposed wastes is approximately 100 feet. In March 1986, EPA found Ordot Landfill in violation of the Clean Water Act for discharging landfill leachate to the Lonfit River without an NPDES permit. The 1987 initial site characterization study concluded that surface flow through the landfill is the source of leachate, the site is hydrologically isolated from the island's sole source aquifer, there is an absence of organic contaminants, inorganic contamination is below the appropriate MCLs, and no air quality problems exist. The study concluded that current threats to human health and the environment are a result of poor landfill operation practices and not a result of the few acres of the landfill which are no longer in operation. The primary contaminants of concern affecting the ground water and surface water include iron and manganese.

The selected remedial action for this site is the no action alternative. EPA concludes that threats to human health and the environment can best be mitigated through addressing operation and maintenance of the landfill, and that the appropriate mechanism for implementing these controls is through enforcement of the Clean Water Act. Further, EPA concludes that any remedial action to address the inactive portion of the landfill would be jeopardized or nullified unless operation practices at the active disposal areas are improved. No costs are associated with the no action alternative.

PERFORMANCE STANDARDS OR GOALS: Not applicable.

INSTITUTIONAL CONTROLS: Not applicable.

SAN GABRIEL VALLEY (AREAS 1, 2, and 4), CA
Second Remedial Action
September 29, 1988

ROD ABSTRACT

The San Gabriel Valley sites consist of four large areas of ground water contamination located approximately 10 to 20 miles east of Los Angeles in Los Angeles County, California. The sites include industrial, commercial, residential, and undeveloped areas. The contaminated ground water underlies significant portions of several cities and outlying areas of the San Gabriel Valley, and appears to be the result of inadequate handling and disposal of industrial solvents by dozens of industrial/commercial facilities. The Main San Gabriel Ground Water Basin, which underlies the San Gabriel Valley, provides over 90% of the water supply for over 1 million people. Ground and surface water, including the San Gabriel and Rio Hondo rivers, flow predominantly to the southwest through Whittier Narrows. Drainage through Whittier Narrows enters Central Basin to the south, another major water supply source. Ground water discharges to surface water in several locations, including a creek in the southwest portion of the valley and the San Gabriel and Rio Hondo rivers near Whittier Narrows. Ground water contamination by VOCs has been detected in over 50 wells at concentrations above the action levels established by the California Department of Health Services. This ROD addresses contamination in the Bartolo Well Field, a private water utility, owned and operated by Suburban Water Systems (SWS) and located along the east side of the San Gabriel River in the Whittier Narrows area. The Bartolo Well Field consists of four public water supply wells that provide over 55 percent of the water supply for approximately 17,000 commercial and residential water customers in SWS's Whittier Service District. They were first identified as contaminated in the the fall of 1986. This action is the first phase of a larger remedial action planned for the Whittier Narrows area and addresses only a small part of the contamination in the San Gabriel Valley Areas 1, 2, and 4 sites. The objective of this action is to partially control the movement and spread of contaminants in the Whittier Narrows area of the San Gabriel Valley, thereby contributing to aquifer restoration of the San Gabriel Valley Areas 1, 2, and 4 sites. Additionally, this action will address the potential public health threat posed by the SWS's Bartolo Well Field. The primary contaminants of concern affecting the ground water are VOCs including PCE and TCE.

The selected remedial action for this site includes: on-site ground water pump and treatment using an air stripping system equipped with air emissions controls, with subsequent discharge to the utility's water distribution system; floodproofing the treatment facility; and ground water monitoring.

PERFORMANCE STANDARDS OR GOALS: Ground water treatment will attain a cumulative 10^{-6} cancer risk level and meet MCLs for TCE 5 ug/l and DCE 7 ug/l. State action levels will be attained by remediating PCE to below 1.0 ppb.

INSTITUTIONAL CONTROLS: Not applicable.

SELMA PRESSURE TREATING, CA
First Remedial Action - Final
September 24, 1988

ROD ABSTRACT

The Selma Pressure Treating site is located in Selma, California, 15 miles south of the City of Fresno. The site encompasses approximately 18 acres, including a three to four-acre wood treatment facility and 14 acres of adjacent vineyards that were used for site drainage. Land use in the vicinity of the site includes agricultural, residential, and industrial areas, with 12 residences and businesses located within 0.25 mile. The ground water resources in the area have been classified as a Sole-Source Aquifer and a current drinking water source with other beneficial uses. Wood preserving activities using pentachlorophenol (PCP) were conducted at the site from 1942 until 1965 under a series of owners. In 1965, a new facility was constructed converting operations to a pressure treating process using chemical preservatives. Prior to 1982, wastes generated from spent retort fluids and sludges were discharged to drainage and percolation ditches, dry wells, and an unlined pond and sludge pit, as well as onto open ground and the adjacent vineyards. An inspection conducted by EPA in 1981 raised concerns about the potential for ground water contamination, and as a result the company was required to modify its operations to minimize the potential for contamination. The total volume of soil requiring remediation is approximately 16,100 yd^3. The primary contaminants of concern affecting the ground water and soil are organics including dioxin and phenols, and metals including arsenic and chromium.

The selected remedial action for this site includes: ground water pump and treatment using precipitation, coagulation, and flocculation with reinjection into the aquifer or off-site discharge; soil excavation and solidification/stabilization with replacement in excavated areas and capping fixed soil with a RCRA cap; ground water and soil monitoring for approximately 30 years; and long-term access and land use restrictions for fixed areas and short-term institutional controls for ground water use. The estimated present worth cost for this remedial action is $11,280,000 with annual O&M of $1,300,000.

PERFORMANCE STANDARDS OR GOALS: Soil cleanup will attain the risk-based goals of dioxin/furan 1 ug/kg and arsenic 50 mg/kg to protect ground water. Ground water treatment will meet the State MCL for chromium of 50 ug/kg.

INSTITUTIONAL CONTROLS: Long-term access and land use restrictions will be placed on areas of fixed soil, and short-term institutional controls will be established to prevent use of contaminated ground water until remediation is complete.

SOUTH BAY ASBESTOS, CA
First Remedial Action - Final
September 29, 1988

ROD ABSTRACT

The South Bay Asbestos (SBA) site is located at the northern end of the Santa Clara Valley at the southernmost extent of San Francisco Bay, in Alviso, California. The site is within an area of approximately 330 acres, and is comprised of a mixture of residential, commercial, light industrial, and agricultural land uses. Approximately 1,700 residents live in Alviso. The site is comprised of a ring levee, which extends around the community of Alviso on the east, north, and northwest. It is approximately four to twelve feet in height, two miles in length, has a trapezoidal shape, and covers an area of about eight acres. A narrow path exists along the crest of the levee. The levee was built by the City of San Jose in 1983 during a major flood caused by the Coyote Creek and the Guadalupe River. It lies within the 100-year flood plain of the Guadalupe River and was constructed on portions of wetland areas adjacent to the community of Alviso. It also abuts wetland areas next to a national wildlife refuge near Alviso. In August 1983, an excavation occurred on property owned by the City of San Jose involving the construction of an outfall structure at the Guadalupe River levee. The excavation revealed asbestos contamination ranging from 20 to 40 percent by area. Contaminated soil was removed between August and December 1983. A September 1983 soil sampling also revealed the presence of asbestos contamination throughout the community of Alviso, including the ring levee. As a result, EPA sprayed the ring levee with a polymer dust suppressant to control asbestos dust in May 1986, in 1987, and again in July 1988. The primary contaminant of concern affecting the soil is asbestos.

The selected remedial action for the ring levee includes: stripping and rough grading of the levee; placement of a compacted soil layer and a top soil cover followed by revegetation to prevent erosion; alteration of the side slopes and construction of a three-foot wide path on the crest of the levee; implementation of strict asbestos/dust control measures during the entire construction operation; and implementation of deed restrictions. The estimated present worth cost for this remedial action is $2,374,700 with annual O&M of $19,000.

PERFORMANCE STANDARDS OR GOALS: The selected remedial action will be protective of public health by creating a barrier to control release of the asbestos fibers. No specific standards or goals were established. Compliance with OSHA Worker Exposure Standards will be maintained during the implementation of the remedy.

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to prevent the disturbance of the soil cover and possible release of asbestos fibers.

TUCSON INTERNATIONAL AIRPORT AREA, AZ
First Remedial Action
August 22, 1988

ROD ABSTRACT

The Tucson International Airport Area (TAA) site encompasses sections of southwest Tucson and adjoining lands south of the city in Pima County, Arizona. The site is located in the Tucson Basin and includes industrial, commercial, residential, and undeveloped areas, as well as the Tucson International Airport, the U.S. Air Force Plant #44 (AFP44), and part of the San Xavier Indian Reservation. The Santa Cruz River borders the site to the west. The ground water system in the Tucson Basin has been designated a Sole-Source Aquifer. Before the discovery of ground water contamination in the TAA, wells within the site boundaries provided water for over 47,000 people. At least 20 facilities have operated in the TAA since 1942. These include aircraft and electronics facilities which discharged waste liquids directly to surface soil; fire drill training areas where uncombusted residual wastes from training operations were left in unlined pits; and unlined landfills which received various wastes from several sources. The first indications of ground water contamination in TAA appeared in the early 1950s, when elevated levels of chromium were detected in a municipal supply well adjacent to AFP44 in the southern portion of the site, and residents in another area complained of foul-smelling water from private supply wells. In 1976, a well was closed at AFP44 by the State because of high levels of chromium. By 1981, additional sampling by the Air Force and EPA had indicated the presence of VOCs in the ground water. Consequently, in 1981, the City of Tucson began closing all municipal wells that exceeded the State Action Level for the principle contaminant TCE, and notified private well users of potential risks. The site was divided approximately in half along Los Reales Road, with the Air Force addressing contamination to the south and EPA addressing contamination to the north. In 1987, the Air Force began operating its ground water pump and treatment system using ion exchange and packed column aeration followed by reinjection into the aquifer. This ROD addresses the ground water contamination in the northern portion of the site, which together with the Air Force remedial ground water system constitutes the overall ground water remedy for the site. The northern portion of the site has been divided into two discrete areas, A and B. Area A lies west of the airport and extends approximately 3.5 miles to the northwest in the direction of ground water flow, and is generally less than a mile wide. Area B consists of two smaller separate areas north of the airport. If further investigations indicate that there is soil contamination which is a source of continuing ground water contamination, a ROD will be developed to address soil remediation. The primary contaminants of concern affecting ground water are VOCs including TCE, benzene, and xylenes.

The selected remedial action for this site includes: ground water pump and treatment of Areas A and B using packed column aeration, followed by discharge of treated water to the municipal water distribution system and treatment of emissions from the treatment process using granular activated carbon, if necessary. The estimated present worth cost for this remedial action is between $7,328,000 and $7,820,000 with annual O&M between $393,000 and $450,000 for years 1-20.

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup levels will attain an overall excess cancer risk of 10^{-6} by remediating TCE to 1.5 ug/l. This will reduce the levels of other contaminants below their respective MCLs, State Action Levels, and 10^{-6} excess cancer risk concentrations.

INSTITUTIONAL CONTROLS: Not applicable.

COMMENCEMENT BAY/NEARSHORE, WA
First Remedial Action
December 30, 1987

ROD ABSTRACT

The Tacoma Tar Pits site covers approximately 30 acres within the Commencement Bay Nearshore/Tideflats site in Tacoma, Pierce County, Washington. The tar pits lie between the Puyallup River, the city, and Wheeler - Osgood Waterways. These bodies of water are not used as a water supply, but support extensive fish and shellfish populations. Currently there is concern for the site's impact on surface water quality and many local industries that use ground water from on-site wells. In 1924, a coal gasification plant began operations, and continued until 1956, at which time they were terminated due to the availability of natural gas. During these years, waste materials from the coal gasification process were disposed of on-site. Contained in the waste materials, were a wide variety of organic compounds and heavy metals. From 1965 to 1966, the plant was dismantled and demolished. Most of the metal structures were removed from the site; however, all demolition debris and below grade structures were left in place, including tanks and pipelines containing tars. In 1967, a metal recycling company began operating at the site. Recycling of automobile batteries introduced acid, heavy metals, lead, and PCBs to the soil. Several studies conducted by EPA and the Washington State Department of Ecology between 1981 and 1983 found contaminants derived from the coal gasification process. The primary contaminants of concern affecting surface water and soil include: benzene, PAHs, PCBs, and lead.

The selected remedial action for this site includes; excavation of all contaminated soils exceeding 1 percent total PAHs and all surface soils exceeding a 10^{-6} lifetime cancer risk level, with stabilization of all excavated soils in a polymer/cement mixture; capping of the stabilized matrix with asphalt; channeling and managing of surface waters; ground water monitoring; and removal and treatment of ponded water. The estimated present worth cost for this remedial action is $3,400,000.

PERFORMANCE STANDARDS OR GOALS: All soils at a depth equal to or less than three feet will be treated to a 10^{-6} lifetime cancer risk. This equals 1 mg/kg for PCB (consistent with TSCA regulations), 1 mg/kg for PAHs, and 56 mg/kg for benzene. Surface soil containing more than 166 mg/kg lead will also be treated. All other soil exceeding 10,000 mg/kg PAH will be excavated and treated in accordance with the State law for the designation of extremely hazardous waste. These standards will be re-evaluated for technical feasibility when the Remedial Action is undertaken.

INSTITUTIONAL CONTROLS: Land use restrictions will be implemented.

COMMENCEMENT BAY/TACOMA, WA
First Remedial Action - Final
March 31, 1988

ROD ABSTRACT

The Commencement Bay/Tacoma site is a 190-acre industrial/municipal landfill located in Pierce County, Tacoma, Washington. The landfill is operated by the City of Tacoma Refuse Utility and is surrounded primarily by residential development and open land, with some commercial and industrial development. Several utilities (i.e., sewer, water, and storm) pass through the site. An aquifer beneath the site provides drinking water to the Town of Fircrest and the City of Tacoma, both of which have wells near the landfill. The aquifer is also used by private individuals for their domestic water supply. Ground water flows predominantly to the southwest toward Leach Creek, which lies approximately 0.25 mile west of the landfill. Consequently, wetlands downstream of the landfill could potentially be exposed to contaminants in the surface water and ground water. The Tacoma landfill began operations in 1960, receiving only nonhazardous wastes including assorted municipal and industrial wastes, construction and demolition wastes, and bulk waste. To date, about four million tons of refuse have been deposited at the landfill to depths of 20 to 80 feet. Although the landfill does not accept hazardous wastes for disposal, it did receive wastes in the 1960s and 1970s that have since been designated as hazardous substances. In 1983, investigations by EPA revealed the presence of hazardous compounds in the ground water and soil near the landfill. Subsequent investigations indicated that the ground water is contaminated with VOCs. In response, the City of Tacoma connected affected residences to the public water system. In 1986, accumulation of landfill gas in a utility vault adjacent to the landfill resulted in a minor explosion. A field survey was initiated to evaluate the extent of off-site gas migration, and based on this survey a gas extraction system was constructed to extract, collect, and combust the gas. Gas samples collected at the landfill revealed high levels of VOCs. The primary contaminants affecting the ground water and surface water are VOCs including benzene, toluene, and xylenes.

The selected remedial action for this site includes: construction of a cap on the landfill with runoff directed to appropriate storm or sanitary sewers, and installation of a gas extraction system and gas probes to monitor methane gas production; installation of a ground water pump and treatment system with discharge of treated water to a local creek or the POTW and alternate water supply if needed; and ground water and surface water monitoring. The estimated present worth cost for this remedial action is between $21,015,000 and $23,418,000. The estimated O&M costs were not provided.

PERFORMANCE STANDARD OR GOALS: Ground water cleanup levels were provided for 10 contaminants of concern based on MCLs, WQC, pretreatment standards, or risk assessments. Individual goals include benzene 5 ug/l (MCL), toluene 14 ug/l (WQC), and xylene 10 ug/l (EPA Risk Assessment).

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to restrict construction of water supply wells in the affected area.

FRONTIER HARD CHROME, WA
First Remedial Action
December 30, 1987

ROD ABSTRACT

The Frontier Hard Chrome (FHC) site covering approximately one-half acre, is located in the City of Vancouver, Washington. Underlying ground water is used as the drinking water supply for the City of Vancouver. Two well fields are within one mile of the FHC site. The site has primarily been occupied by two businesses engaged in the chrome plating industry. Pioneer Plating operated at the site from 1958 to 1970. The site was then occupied by FHC until 1983. During Pioneer's operation and FHC's initial operation, chromium plating wastes were discharged to the sanitary sewer system. In 1975, the City of Vancouver determined that chromium in FHC's waste water was upsetting the operation of its new secondary treatment system. FHC was directed by Vancouver and the Washington Department of Ecology (Ecology) to cease discharge to the sewer system until a treatment system was installed to remove chromium from their waste. At that time, FHC began discharge of their untreated plating wastes to a drywell behind the facility. In 1976, FHC was given a waste water disposal permit for discharge to the drywell by Ecology. The permit also contained a schedule for completion of a treatment system for their wastes. In 1982, Ecology found FHC in violation of the Dangerous Waste Act for the illegal disposal for hazardous wastes. In 1983, Ecology ordered FHC to stop discharge of chromium plating wastes to the drywell. Ecology discovered chromium in the ground water at more than twice the drinking water standards, and in soil and FHC building structures.

The selected remedial action for this site includes: excavation of 7,400 yd^3 of chromium contaminated soils exceeding 550 mg/kg, with on-site treatment using chemical stabilization followed by on-site disposal of treatment residuals and placement of a final site cover; and demolition of the FHC building. The estimated present worth cost for this remedial action is $2,000,000.

PERFORMANCE STANDARDS OR GOALS: Currently, there are no standards for chromium in the soil. The site-specific determination made at the FHC site was to treat soils in excess of 550 mg/kg chromium. This determination was made relative to the drinking water standard which would be applicable in the future cleanup of ground water beneath the site.

INSTITUTIONAL CONTROLS: Not applicable.

FRONTIER HARD CHROME, WA
Second Remedial Action - Final
July 5, 1988

ROD ABSTRACT

The Frontier Hard Chrome (FHC) site, covering approximately one-half acre, is located in the City of Vancouver, Washington. The areal ground water is used as the drinking water supply for the City of Vancouver, which has two well fields within one mile of the site. Since 1955, the site has primarily been occupied by two companies engaged in the chrome plating business. Pioneer Plating operated at the site from 1958 to 1970. The site was then occupied by FHC until 1983. Presently, the facility is being used as a storage and staging area for a neighboring business. During the operation of Pioneer and the initial operation of FHC, chromium plating wastes were discharged to the sanitary sewer system. In 1975, the City of Vancouver determined that the chromium in the wastewater from FHC was upsetting the operation of its new secondary treatment system. FHC was directed by the City and the Washington Department of Ecology (Ecology) to cease discharge to the sewer system until a treatment system was installed to remove the chromium waste. At that time, FHC began discharge of their untreated plating wastes to a dry well behind the facility. In 1976, Ecology permitted FHC to discharge to the dry well. Additionally, the permit contained a schedule for completion of a waste treatment system. Between 1976 and 1981, several extensions of the permit and schedule were granted, as the deadlines passed without compliance. In 1982, Ecology found FHC in violation of the Washington State Dangerous Waste Act for the illegal disposal of hazardous wastes, and in 1983 ordered FHC to stop discharging to the dry well. As a result, FHC also was required to prepare a plan for the investigation of the ground water. FHC closed down all operations at the site. The company did not undertake the investigation. In December 1987, EPA published a ROD for the site's first operable unit, which addressed the soil contamination. This second and final operable unit addresses chromium contaminated ground water.

The selected remedial action for this site includes: ground water pump and treatment using selective media ion exchange to remove chromium, followed by carbon adsorption to remove VOCs with discharge into the river or the city sanitary sewer; ground water monitoring; and implementation of institutional controls to restrict ground water usage and to control new well drilling. The estimated present worth cost for this remedy is $3,800,000.

PERFORMANCE STANDARDS OR GOALS: The selected remedy prevents public exposure to drinking water that exceeds MCLs for hexavalent chromium 0.05 mg/l, TCE 0.005 mg/l, and 1,1,1-trichloroethane 0.2 mg/l. Additionally, treated ground water will meet NPDES requirements, EPA Water Quality Criteria for protection of freshwater aquatic life, or city pretreatment requirements (depending on remedial action determinations for discharge).

INSTITUTIONAL CONTROLS: The use of ground water in and around the contaminated plume will be restricted. These restrictions will be designed to last until chromium levels reach drinking water standards.

GOULD, OR
First Remedial Action
March 31, 1988

ROD ABSTRACT

The Gould site is located in a heavily industrial area of Portland, Oregon, approximately 1.3 miles southeast of St. John's Bridge. The site is contained in a 60-acre study area consisting of the Gould property and outlying areas containing battery casings and other residues from site operations. The area is sparsely populated and lies on the left bank floodplain of the Willamette River. Doane Lake, a small pond, is located adjacent to the site. The Gould site is mostly paved with asphalt, therefore, on-site flora and fauna are limited. Between 1949 and 1981, various owners operated the site as a secondary lead smelting facility specializing in lead-acid battery recycling, lead-smelting and refining, zinc alloying and casting, cable sweating, and lead oxide production. Operations ceased in August 1981; by the summer of 1982, most of the structures, facilities, and equipment were removed. Remedial investigation and production records estimate that 86,900 tons of battery casings, 11,800 tons of matte, and 6,570,000 gallons of acid were disposed of at the site. Approximately 2% of the total volume of battery casings is located in surface piles, the remaining 98% is used as fill material, and is in direct contact with ground water. The primary contaminants of concern affecting the soil and sediments are lead and lead oxide. VOCs were discovered in ground water, but will be addressed in a future operable unit.

The selected remedial action for the soils unit at the site include: excavation of all battery casing fragments and matte from the Gould property and adjacent contaminated areas; a phased design program to determine the amount of material that can be recycled, and to minimize the amount of material that must be RCRA landfilled; separation of battery casing fragments; recycling of all applicable components; off-site disposal of nonrecyclable material failing the EP Toxicity test; on-site disposal of nonhazardous, nonrecyclable components; excavation, fixation/stabilization, and on-site disposal of remaining contaminated soil, sediments, and matte with soil capping and revegetation; isolation of surface water runoff to East Doane Lake by site regrading; and a monitoring program to determine changes in ground water contamination over time and to ensure that remediation does not adversely impact air quality. Additional ground and surface water studies will be performed to determine the need for remediation of the media. The estimated capital cost of this remedy is $3,491,603, assuming a "worst case" scenario where little of the material is recyclable, with present worth O&M of $17,073,581.

PERFORMANCE STANDARDS OR GOALS: Surface soils having a total lead content above 1000 mg/kg, and subsurface soils, matte, and East Doane Lake sediments failing the EP Toxicity test, will be fixated and disposed of on-site. Site boundaries will be monitored to determine if lead exceeds the NAAQs of 1.5 ug/m^3.

INSTITUTIONAL CONTROLS: The remedy will incorporate institutional controls; however, individual controls were not specified.

MARTIN MARIETTA, OR
First Remedial Action - Final
September 29, 1988

ROD ABSTRACT

The 350-acre Martin Marietta Reduction Facility (MMRF) site is located in The Dalles, Wasco County, Oregon. The site lies within an 800-acre area used primarily for heavy industry and manufacturing; land not used for industrial processes is leased for agricultural purposes. Less than 20 homes and businesses are located in the area of the site. Ground water is an important source of water supply in The Dalles area for domestic, industrial, and agricultural uses, and flows in an easterly direction toward the Columbia River. From 1958 to 1970, Harvey Aluminum, Inc., operated a processing facility designed to produce about 90,000 tons of aluminum a year. Martin Marietta Corporation (MMC) acquired the facility in 1970 and continued aluminum processing operations until 1984, when the plant was shut down. In 1986, MMC leased the plant and adjacent portions of the property to Northwest Aluminum Company, which resumed aluminum operations in 1987. The MMRF site consists of 28 areas of significant contamination resulting from treatment, storage, and disposal practices at the site. A 15-acre landfill located near the aluminum reduction building contains approximately 200,000 yd^3 of waste and plant construction debris. Leachate emanating from the landfill operations prior to the installation of a leachate collection system has resulted in the contamination of the area aquifer. Significant waste types in the landfill include asbestos, metallic wastes, and 5,000 tons of spent cathode waste materials containing cyanide, PAHs, and arsenic. In addition to the landfill, approximately 64,670 yd^3 of cathode waste material was deposited in areas referred to as the unloading area and the cathode waste management areas scrubber sludge ponds, consisting of four surface impoundments, two of which are covered with soil and vegetation, cover 14.8 acres, and contain contaminated sludge and subsoil. The primary contaminants of concern affecting the soil, ground water, and debris are VOCs including TCE, organics including PAHs, inorganics including asbestos and cyanide, and metals including arsenic.

The selected remedial action for this site includes: excavation of the cathode waste material and placement into the existing landfill, and covering the landfill with a RCRA cap; placement of a soil cover over scrubber sludge ponds 2 and 3; plugging and abandonment of nearby production wells and connecting ground water users to the City of Dalles water supply system; collection and on-site treatment of leachate generated from the landfill, the perched water east of River Road and the cathode waste management areas, and the ground water in the unloading area using an aqueous treatment system with on-site discharge to a recycling pond; ground water monitoring; establishment of a contingency plan to perform additional recovery of ground water in the event further contamination is detected; and implementation of institutional controls. The estimated present worth cost for this remedial action is $6,707,400 with annual O&M of $144,000 for years 1-5 and $55,600 for years 6-30.

PERFORMANCE STANDARDS OR GOALS: Cleanup goals based on human health risks and the potential for contaminants leaching to ground water will be attained for soil and include arsenic 65 mg/kg (carcinogenic risk) and PAHs 175 mg/kg (urban background). Ground water ACLs including fluoride 9.7 mg/l and sulfate 3,020 mg/l were selected for portions of the aquifer where concentrations exceed the State of Oregon MCLs.

INSTITUTIONAL CONTROLS: Deed and well use restrictions will be implemented during and after remediation.

PACIFIC HIDE & FUR, ID
First Remedial Action - Final
June 28, 1988

ROD ABSTRACT

The Pacific Hide & Fur (PHF) site consists of approximately 11-acres of fenced land and is located in the northwest edge of Pocatello, Bannock County, Idaho. The site, a former gravel mining area, was purchased by McCarty's, Inc., (MI), a scrap metal dealer, in 1958. MI purchased scrap metal, batteries, drained transformers, and capacitors filled with PCB oils from various sources, storing them on-site in a previously excavated gravel pit. The waste is stored in the excavated pit, comprised of approximately three acres, for resale, reuse, or salvage. In August 1979, PHF purchased the rights to salvage scrap metal for four years. In the course of salvage operations, materials may have been moved from the pit. Also, PHF may have purchased scrap metals and transformers and stored them on-site. Records indicate that none of the new transformers purchased by PHF contained PCB oils. Transformers containing fluids were drained into site drums or into the pit. In January 1983, the U.S. EPA and the Idaho Department of Health and Welfare (IDHW) began investigating the site to determine whether disposal of PCB oils were occurring on or off-site due to operations at the metal facility. EPA declared the site to be an immediate threat to public health and welfare. As a result, approximately 593 PCB capacitors were transported off-site for incineration, and 21 hazardous materials drums and 30 cubic yards of soil were transported off-site for disposal. Additionally, 11 ground water wells and a security fence were installed at the site. The primary contaminants of concern affecting the soil are PCBs.

The selected remedial action for this site includes: excavation of soil to an average of 1.5 feet followed by screening to separate large contaminated materials and testing for further contamination; stabilization of a portion of the soil using an immobilization technique; construction of a bottom clay liner, where necessary; capping of the stabilized and remaining materials; removal of some ground water monitoring wells; ground water monitoring; and deed and access restrictions. If the fixation technology is found to be impracticable, on-site containment will be implemented as the final remedial action. The estimated present value of this remedial action ranges from $1,330,000 to $1,890,000. There is no O&M associated with this remedy.

PERFORMANCE STANDARDS OR GOALS: The soil cleanup goal for PCBs of 25 mg/kg by weight was established as the EPA cleanup policy for PCB spills, and corresponds with a 10^{-4} to 10^{-6} health-based risk level for the entire site (including hot spot areas).

INSTITUTIONAL CONTROLS: Deed restrictions to prohibit excavation or drilling will be developed consistent with final design determinations.

APPENDIX C

FEDERAL REGISTER NOTICES OF SUPERFUND PROGRAM ACTIONS TAKEN IN FISCAL 1988

Progress toward implementing Superfund is reflected in *Federal Register* notices of the Superfund program actions taken during the fiscal year. During FY88, the Superfund program published 107 notices of action in the *Federal Register*. The actions that the Agency took resulted in its publishing notices of proposed and final rules, guidance documents, requests for public comment, and proposed consent decrees issued by the Department of Justice. The following table provides the date, citation, action, and subject of each of these *Federal Register* notices. Where appropriate, it also provides the statutory authority for the action listed. Unless otherwise noted, the statute cited is CERCLA.

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FEDERAL REGISTER NOTICES OF SUPERFUND PROGRAM ACTIONS TAKEN IN FISCAL 1988

(continued)

	Date	Citation/Action	Subject
1.	OCT 15 1987	52 *FR* 38340 (Request for comment) (§104(i)).	Availability of draft toxicological profiles for 25 of the 100 chemicals that EPA and ATSDR have determined can be found at NPL sites and may pose the most significant threats to human health.
2.	OCT 21	52 *FR* 39386 (Request for comment) (§123).	Interim final rule providing for reimbursement of local governments for costs incurred in responding to releases or threatened releases of hazardous substances.
3.	OCT 26	52 *FR* 40844 (Semi-annual revision of regulatory agenda).	Schedule for CERCLA regulations that EPA is developing, revising, and reviewing.
4.	NOV 12	52 *FR* 43393 (Publication of draft language) (§122(g)(4)).	Language for drafting *de minimis* waste contributor administrative order on consent and consent decrees.
5.	NOV 19	52 *FR* 44481 (Request for comment) (§122(d)(3), (h), (i)).	Proposed administrative settlement for cost recovery action at the Union Chemical Co., Inc. site in South Hope, Maine.
6.	NOV 23	52 *FR* 44938 (Request for comment) (§107(a)).	Department of Justice (DOJ) proposed consent decree for cost recovery action at the Shenango River Project site in Vernon, Ohio.

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FEDERAL REGISTER NOTICES OF SUPERFUND PROGRAM ACTIONS TAKEN IN FISCAL 1988

(continued)

	Date	Citation/Action	Subject
7.	DEC 8	52 *FR* 46538 (Request for comment).	DOJ proposed consent decree requiring the cleanup and maintenance of remedy at the McAdoo Associates site in McAdoo Borough, Pennsylvania.
8.	JAN 13 1988	53 *FR* 850 (Proposed rule) (§120(h)).	Form and manner of contracts notice required in transferring Federal real property on which any hazardous substance has been stored, released, or disposed.
9.	JAN 14	53 *FR* 959 (Request for comment).	DOJ proposed consent decree for partial cost recovery action at the SCRDI Bluff Road site in Columbia, South Carolina.
10.	JAN 21	53 *FR* 1641 (Extension of comment period).	Proposed rule for remedial actions at inactive uranium processing sites.
11.	FEB 8	53 *FR* 3644 (Request for comment) (§106(a)).	DOJ proposed consent decree resolving action to compel funding and implementation of remedial action at the Johns-Manville Corp. site in Waukegan, Illinois.
12.	FEB 10	53 *FR* 3948 (Request for comment). (§122(d)(2)).	DOJ proposed consent decree for cost recovery action and claims for injunctive relief at the Picillo Farm site in Coventry, Rhode Island.

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FEDERAL REGISTER NOTICES OF SUPERFUND PROGRAM ACTIONS TAKEN IN FISCAL 1988
(continued)

	Date	Citation/Action	Subject
13.	FEB 11	53 *FR* 4070 (Request for comment) (§§107, 122(g), 122(i)).	Proposed *de minimis* settlement for several sites in Region 1: the Plymouth Harbor/Cannon Engineering Corp. (CEC) site in Plymouth, Massachusetts; the Tinkhams Garage site in Londonderry, New Hampshire; and the Gilson Road site in Nashua, New Hampshire.
14.	FEB 11	53 *FR* 4085 (Request for comment). (§122(d)(2)).	DOJ proposed consent decree determining responsibility for cost recovery action at the Rocky Mountain Arsenal in Adams County, Colorado.
15.	FEB 12	53 *FR* 4280 (Initial docket listing) (§120).	Initial listing of facilities on Federal Agency Hazardous Waste Compliance Docket.
16.	FEB 23	53 *FR* 5298 (Request for comment) (§§104(a), 122(a), 122(e)).	Interim guidance on notice letters, negotiations, and information exchange.
17.	MAR 2	53 *FR* 6712 (Request for comment) (§107).	DOJ proposed consent decree for cost recovery action and implementation of remedial action at the Tysons Dump site in Upper Merion Township, Pennsylvania.

APPENDIX C

FEDERAL REGISTER NOTICES OF SUPERFUND PROGRAM ACTIONS TAKEN IN FISCAL 1988
(continued)

	Date	Citation/Action	Subject
18.	MAR 2	53 *FR* 6762 (Request for comment) (§§102(a), 102(b), 103(a), 104(b) 101(14)).	Proposed adjustment rule for one of the two remaining CERCLA hazardous substances without a proposed or final adjusted reportable quantity (RQ), lead metal. Proposed readjustment of RQs for four lead compounds. Proposed delisting of one CERCLA hazardous substance. Proposed replacement of the trademark "Kelthane" with its generic equivalent.
19.	MAR 9	53 *FR* 7582 (Request for comment) (§122(i)).	DOJ proposed consent decree for partial cost recovery action and implementation of first phase of remedial action at the Sand, Gravel, & Stone site in Elkton, Maryland.
20.	MAR 14	53 *FR* 8223 (Request for comment) (§105).	Proposed rule for deleting two sites from the NPL: the Varsol Spill site in Miami, Florida and the Tri-City Oil Conservationist, Inc. site in Tampa, Florida.
21.	MAR 14	53 *FR* 8279 (Request for comment) (§122).	Guidance that evaluates three types of mixed funding settlements, under CERCLA.
22.	MAR 17	53 *FR* 8814 (Request for comment).	DOJ proposed consent decree for cost recovery action at the Harvey & Knott Drum, Inc. site in Kirkwood, Delaware.

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FEDERAL REGISTER NOTICES OF SUPERFUND PROGRAM ACTIONS TAKEN IN FISCAL 1988
(continued)

	Date	Citation/Action	Subject
23.	MAR 17	53 *FR* 8816 (Request for comment).	Proposed administrative settlement for partial cost recovery action at the Operating Industries, Inc. Landfill site in Monterey Park, California.
24.	MAR 24	53 *FR* 9700 (Request for comment) (§122(h), (i)).	Proposed administrative settlement for cost recovery action at the Pollution Abatement Services site in Oswego, New York.
25.	MAR 24	53 *FR* 9736 (Request for comment) (§117(e)).	Interim final rule on procedures for communities near National Priorities List (NPL) sites to obtain Technical Assistance Grants (TAGs) of up to $50,000.
26.	MAR 24	53 *FR* 9753 (Request for comment) (§117(e)).	Proposal to provide TAG applicants and recipients with the services of an Administrative Services Contractor, whose function is to make the grant program easier to use and implement.
27.	MAR 24	53 *FR* 9756 (Request for comment) (§117(e)).	Availability of new financial assistance program, the TAG program. Procedures for State and local review of grant applications.

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FEDERAL REGISTER NOTICES OF SUPERFUND PROGRAM ACTIONS TAKEN IN FISCAL 1988

(continued)

Date	Citation/Action	Subject
28. MAR 25	53 *FR* 9807 (Request for comment). (§122(i)).	Proposed administrative settlement for costs incurred in removal action at the CSI Technologies site in Escondido, California.
29. MAR 25	53 *FR* 9823 (Request for comment) (§§106(b), 107).	DOJ proposed consent decree addressing alleged PRP violations of an administrative order at the Scientific Chemical Processing Site in Carlstadt, New Jersey.
30. MAR 28	53 *FR* 9993 (Request for comment) (§§106, 107).	DOJ proposed consent decree for cost recovery action at the Mid-South Wood Products site in Mena, Arkansas.
31. APR 1	53 *FR* 10560 (Request for comment) (§122(h)).	Proposed administrative settlement for recovery of costs incurred in removal action at the Woodward Property site in Myrtle Beach, South Carolina.
32. APR 11	53 *FR* 11889 (Extension of comment period).	Proposed rule on CERCLA hazardous substance RQ adjustments.
33. APR 11	53 *FR* 11890 (Supplement to proposed rule) (§102(a)).	New information/RQ adjustments for some CERCLA hazardous substances originally proposed on March 16, 1987.

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FEDERAL REGISTER NOTICES OF SUPERFUND PROGRAM ACTIONS TAKEN IN FISCAL 1988
(continued)

	Date	Citation/Action	Subject
34.	APR 13	53 *FR* 12201 (Request for comment) (§§104, 107).	DOJ proposed consent decree for cost recovery action at various sites in Cook and Lee Counties, Illinois.
35.	APR 13	53 *FR* 12201 (Request for comment).	DOJ proposed consent decree for cost recovery action and implementation of cleanup at the Chisman Creek site in York County, Virginia.
36.	APR 13	53 *FR* 12201 (Request for comment) (§122(d)(2)).	DOJ proposed consent decree for cost recovery action at the Carolawn, Inc. site in Fort Lawn, South Carolina.
37.	APR 15	53 *FR* 12613 (Request for comment).	DOJ proposed consent decree for cost recovery action at the Bayou Sorrel Site in Bayou Sorrel, Louisiana.
38.	APR 18	53 *FR* 12680 (Final rule) (§105).	Deletion of three sites from the NPL: the Middletown Road Dump site in Annapolis, Maryland; the Harris (Farley Street) site in Houston, Texas; and the Mountain View Mobile Home site in Globe, Arizona.
39.	APR 19	53 *FR* 12868 (Request for comment) (§§102, 103).	Proposed rule for reduced reporting for continuous releases of hazardous substances.

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FEDERAL REGISTER NOTICES OF SUPERFUND PROGRAM ACTIONS TAKEN IN FISCAL 1988
(continued)

	Date	Citation/Action	Subject
40.	APR 25	53 *FR* 14334 (Semi-annual revision of regulatory agenda).	Schedule for CERCLA regulations that EPA is developing, revising, and reviewing.
41.	APR 26	53 *FR* 14862 (Request for comment) (§§106, 107).	DOJ proposed consent decree for cost recovery action at the Anaconda Co. Smelter site in Anaconda, Montana requiring site stabilization and funding of permanent relocation of the residents of Mill Creek, Montana.
42.	APR 27	53 *FR* 15129 (Request for comment) (§122(h), (i)).	Proposed administrative settlement for recovery of removal action costs from 58 PRPs at the Bourdeaudhui site in Willington, Connecticut and the Kapinos site in Willington, Connecticut.
43.	APR 27	53 *FR* 15129 (Request for comment) (§122(h), (i)).	Proposed administrative settlement for recovery of removal action costs from 10 PRPs at the Bourdeaudhui site in Willington, Connecticut and the Kapinos site in Willington, Connecticut.
44.	APR 28	53 *FR* 15299 (Request for comment) (§107).	DOJ proposed consent decree for costs incurred in removal action at the George O'Bryan Site in Louisville, Kentucky.

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FEDERAL REGISTER NOTICES OF SUPERFUND PROGRAM ACTIONS TAKEN IN FISCAL 1988
(continued)

	Date	Citation/Action	Subject
45.	MAY 5	53 *FR* 16086 (Request for comment) (§109(c),(d)).	Interim final rule on eligibility and procedures for granting and receiving awards of up to $10,000 for information leading to successful prosecution for the criminal violation of CERCLA.
46.	MAY 13	53 *FR* 17120 (Request for comment).	DOJ proposed consent decree for cost recovery and funding of remedial action at the Price Landfill site in Pleasantville, New Jersey.
47.	MAY 16	53 *FR* 17228 (Request for comment) (§105; 40 CFR §300.66(c)(8)).	Proposed rule for deleting three sites from the NPL: the Gallaway Pits site in Gallaway, Tennessee; the Lee's Lane Landfill site in Louisville, Kentucky; and the Newport Dump in Newport, Kentucky.
48.	MAY 19	53 *FR* 17987 (Request for comment)	DOJ proposed consent decree for cost recovery action at the McKin Co. site in Gray, Maine.
49.	MAY 25	53 *FR* 18913 (Request for comment).	DOJ proposed consent decree for recovery of removal action costs incurred at the Waste Disposal, Inc. site in Santa Fe Springs, California.

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(continued)

	Date	Citation/Action	Subject
50.	MAY 31	53 *FR* 19805 (Reopening of comment period).	Reopening of comment period for March 24, 1988 interim final rule on Technical Assistance Grants in response to requests from the public.
51.	JUNE 2	53 *FR* 20162 (Request for comment).	Description of the Integrated Risk Information System (IRIS), which contains summaries of some Superfund regulations, such as the rules pertaining to RQs.
52.	JUNE 2	53 *FR* 20165 (Request for comment) (§§107, 122(g), 122(1)).	Proposed *de minimis* settlement identical to the agreement published on February 11, 1988. Settling parties were unable to participate in the first settlement for administrative reasons.
53.	JUNE 10	53 *FR* 21929 (Request for comment).	DOJ proposed consent decree for recovery of removal costs incurred at 89 compressor station sites along a gas pipeline. The sites are located in Alabama, Arkansas, Illinois, Indiana, Kentucky, Louisiana, Maryland, Mississippi, Missouri, New Jersey, Ohio, Pennsylvania, Tennessee, and Texas.

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(continued)

	Date	Citation/Action	Subject
54.	JUNE 14	53 *FR* 22222 (Request for comment) (§122(d)(3), (h)(1), (i)(1)).	Proposed administrative settlement for recovery of remedial investigation (RI) costs and requiring implementation of feasibility study (FS) work at the Dover Municipal Landfill in Dover, New Hampshire.
55.	JUNE 16	53 *FR* 22566 (Request for comment) (§§107, 122(i)).	DOJ proposed administrative settlement for recovery of removal costs incurred at the United Rigging and Hauling site in Beltsville, Maryland.
56.	JUNE 23	53 *FR* 23661 (Request for comment) (§122(h)).	Proposed administrative settlement for recovery of costs incurred in removal action at the Southern Lumber site in Crosby, Mississippi.
57.	JUNE 24	53 *FR* 23978 (Request for comment) (§105).	Proposed rule to add 13 sites previously proposed for the NPL and delete 30 sites from the NPL. All 43 sites are subject to corrective action authority under RCRA Subtitle C.
58.	JUNE 24	53 *FR* 23988 (Request for comment) (§105).	Update #7 of the NPL, which proposes to add 229 new sites, expand one final site, and repropose four sites.

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(continued)

Date	Citation/Action	Subject
59. JUNE 27	53 *FR* 24141 (Request for comment).	Availability of two external review drafts, a cancer risk-specific dose estimate document and a document estimating exposure.
60. JUNE 29	53 *FR* 24496 (Request for comment) (§122(h)).	Proposed administrative settlement for recovery of costs incurred in removal action at the Buckhorn Pesticide site in Buckhorn, North Carolina.
61. JULY 5	53 *FR* 25218 (Request for comment) (§§106, 107).	DOJ proposed partial consent decree for cost recovery action at the A&F Material Reclaiming, Inc. site in Greenup, Illinois.
62. JULY 7	53 *FR* 25537 (Formation of discussion group).	Availability of minutes from the first meeting of the Municipal Settlement Discussion Group, which addresses how municipalities should fit into the Superfund settlement process.
63. JULY 11	53 *FR* 26090 (Request for comment) (§105).	Proposed rule for deleting from the NPL the A.L. Taylor (Valley of Drums) site in Brooks, Kentucky.
64. JULY 14	53 *FR* 26660 (Meeting announcement).	Municipal Settlement Discussion Group meeting on August 4, 1988.

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FEDERAL REGISTER NOTICES OF SUPERFUND PROGRAM ACTIONS TAKEN IN FISCAL 1988 (continued)

Date	Citation/Action	Subject
65. JULY 15	53 *FR* 26858 (Request for comment) (§122(h)).	Proposed administrative settlement for recovery of costs incurred in removal action at the A.Y. McDonald Industries, Inc. site in Dubuque, Iowa.
66. JULY 15	53 *FR* 26859 (Request for comment) (§122(h)).	Proposed administrative settlement for recovery of costs incurred in removal action at the Babb Drum site in Little Chicago, South Carolina.
67. JULY 19	53 *FR* 27268 (Request for comment) (§§101, 102, 103, 107, 109).	Clarification of the Federally permitted release exemption from reporting and liability provisions.
68. JULY 20	53 *FR* 27371 (Request for comment) (§105).	Proposed rule for deleting from the NPL the Matthews Electroplating site in Roanoke County, Virginia.
69. JULY 20	53 *FR* 27393 (Request for comment) (§122(h)).	Proposed administrative settlement for recovery of costs incurred in removal action at the Salvo Property site in Lithia Springs, Georgia.
70. JULY 20	53 *FR* 27411 (Request for comment) (§§104, 106).	DOJ proposed consent decree for failure to provide access to an authorized representative of the United States to the Arkwood, Inc. site in Omaha, Arkansas.

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	Date	Citation/Action	Subject
71.	JULY 22	53 *FR* 27679 (Proposed rule).	Provisions for Occupational Safety and Health Administration enforcement of the Hazard Communication Standard (HCS).
72.	JULY 27	53 *FR* 28278 (Request for comment) (§122(i)).	DOJ proposed consent decree requiring the implementation of interim remedial action, cost recovery action, and the performance of RI/FS at the Saltville Waste Disposal Ponds site in Saltville, Virginia.
73.	JULY 28	53 *FR* 28414 (Request for comment) (§105).	Proposed rule for deleting from the NPL the Presque Isle site in Erie, Pennsylvania.
74.	JULY 28	53 *FR* 28456 (Request for comment).	DOJ proposed consent decree requiring the implementation of the selected remedy at the Gold Coast Oil Corp. site in Miami, Florida.
75.	AUG 4	53 *FR* 29428 (Proposed rule) (§§107(a), 122(h)).	Procedures for use of arbitration to settle cost recovery claims in cases in which the total response costs for a site do not exceed $500,000.
76.	AUG 5	53 *FR* 29484 (Request for comment) (NCP §300.66(c)).	Proposed rule for deleting the Mowbray Engineering Co. site in Greenville, Alabama from the NPL.

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(continued)

	Date	Citation/Action	Subject
77.	AUG 8	53 *FR* 29789 (Request for comment) (§107).	Three DOJ proposed consent decrees for cost recovery action at the Goose Farm site in Plumstead Township, New Jersey.
78.	AUG 8	53 *FR* 29789 (Request for comment) (§§107, 122(g)).	DOJ proposed consent decree for costs incurred and to be incurred at the Lipari Landfill in Pitman, New Jersey.
79.	AUG 8	53 *FR* 29790 (Request for comment) (§107).	DOJ proposed consent decree for costs incurred in removal action at the Bliss/Frontenac site in Frontenac, Missouri.
80.	AUG 9	53 *FR* 29959 (Request for comment).	Two DOJ proposed partial consent decrees for the four sites originally proposed for administrative settlement on February 11, 1988.
81.	AUG 9	53 *FR* 30002 (Request for comment) (§§101(23), 101(24), 105(a)(8)(A), 105(a)(8)(B)).	Proposed policy statement on criteria for determining inability of RCRA-regulated site owner/operators to finance cleanups, thus allowing some RCRA sites to be proposed for the NPL.
82.	AUG 9	53 *FR* 30005 (Policy statement) (§§101(23), 101(24), 105(a)(8)(A), 105(a)(8)(B)).	Policy statement on criteria for determining unwillingness of RCRA-regulated site owner/operators to finance cleanups, thus allowing some RCRA sites to be proposed for the NPL.

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FEDERAL REGISTER NOTICES OF SUPERFUND PROGRAM ACTIONS TAKEN IN FISCAL 1988

(continued)

	Date	Citation/Action	Subject
83.	AUG 10	53 *FR* 30120 (Request for comment).	DOJ proposed consent decree for cost recovery action at the City Industries, Inc. site in Orlando, Florida.
84.	AUG 12	53 *FR* 30452 (Request for comment) (§105).	Proposed rule for deleting from the NPL the Toftdahl Drums site in Bush Prairie, Washington.
85.	AUG 18	53 *FR* 31402 (Request for comment).	DOJ proposed stipulation concerning distribution of proceeds from the sale or lease of parts of the American Creosote Works, Inc. site in Pensacola, Florida.
86.	AUG 18	53 *FR* 31403 (Request for comment).	DOJ proposed consent decree to grant access to and not allow PRPs to interfere with the remedy selected for the Taylor Borough Dump site in Taylor Borough, Pennsylvania.
87.	AUG 22	53 *FR* 31871 (Final rule) (§109(e)).	Procurement procedures for contracting expert services in preparing or prosecuting a civil or criminal action.

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(continued)

	Date	Citation/Action	Subject
88.	AUG 29	53 *FR* 32899 (Postponement).	Postponement of North Carolina withdrawal proceedings published on June 7, 1988. EPA suspends the hearing until further notice, pending a national policy review of CERCLA capacity issues.
89.	AUG 29	53 *FR* 32949 (Request for comment).	DOJ proposed partial consent decree for cost recovery action at the Olean Well Field site in Olean, New York.
90.	AUG 31	53 *FR* 33557 (Request for comment) (§§106, 107).	DOJ proposed consent decree for cost recovery action and implementation of selected remedy at the Seymour Recycling Corp. site in Seymour, Indiana.
91.	AUG 31	53 *FR* 33558 (Request for comment).	DOJ proposed consent decree for cost recovery action at the Times Oil Co. site in Tacoma, Washington.
92.	AUG 31	53 *FR* 33618 (Request for comment) (§104(c)(9), (k)).	Availability of draft guidance for meeting capacity assurance requirements and preparing State Capacity Assurance Plans (CAPs).
93.	SEPT 1	53 *FR* 33811 (Notice of deletion).	Deletion of two sites originally proposed for deletion from the NPL on March 14, 1988.

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FEDERAL REGISTER NOTICES OF SUPERFUND PROGRAM ACTIONS TAKEN IN FISCAL 1988
(continued)

	Date	Citation/Action	Subject
94.	SEPT 2	53 *FR* 34173 (Request for comment).	DOJ proposed consent decree for cost recovery action and implementation of the selected remedy at the Celanese Corp. (Shelby Fiber Operations) site in Shelby, North Carolina.
95.	SEPT 7	53 *FR* 34593 (Request for comment) (§§106, 107).	DOJ proposed consent decree for cost recovery action and implementation of the selected remedy at the Brown Wood Preserving site in Live Oak, Florida.
96.	SEPT 9	53 *FR* 35110 (Request for comment) (§122(h)).	Proposed administrative settlement for costs incurred in removal action at the Rome Coal Tar site in Rome, Georgia.
97.	SEPT 13	53 *FR* 35373 (Request for comment) (§122(h)).	Proposed administrative settlement for costs incurred in removal action at the Clayton Ballfield Pesticide site in Clayton, North Carolina.
98.	SEPT 13	53 *FR* 35373 (Request for comment) (§122(h)).	Proposed administrative settlement for costs incurred in removal action at the Rock Road Drums Spill site in Greenville, South Carolina.

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FEDERAL REGISTER NOTICES OF SUPERFUND PROGRAM ACTIONS TAKEN IN FISCAL 1988

(continued)

	Date	Citation/Action	Subject
99.	SEPT 13	53 *FR* 35412 (Final rule) (§§101(14), 102(b), 103(a)).	Amendments to 40 CFR 302, which designates six wastes as CERCLA hazardous substances and establishes RQs applicable to those wastes.
100.	SEPT 20	53 *FR* 36489 (Correction).	Correction of date of end of comment period for the proposed rule for deleting the Mowbray Engineering Co. site in Greenville, Alabama from the NPL. The proposed rule was published on August 5, 1988.
101.	SEPT 20	53 *FR* 36489 (Request for comment) (§122(h)).	Proposed administrative settlement for costs incurred in removal action at the Bostic Drum site in Holly Ridge, North Carolina.
102.	SEPT 21	53 *FR* 36661 (Request for comment).	DOJ proposed consent decree for cost recovery action and implementation of remedial action at the Litchfield Airport Area site in Goodyear/Avondale, Arizona.
103.	SEPT 22	53 *FR* 36869 (Request for comment) (§105(e), 40 CFR §300.66(c)(7)).	Proposed rule for deleting the New Castle Steel site in New Castle County, Delaware from the NPL.

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FEDERAL REGISTER NOTICES OF SUPERFUND PROGRAM ACTIONS TAKEN IN FISCAL 1988
(continued)

Date	Citation/Action	Subject
104. SEPT 23	53 *FR* 37051 (Request for comment) (§122(h)).	Proposed administrative settlement for costs incurred in removal action at the Miller site in Roan Mountain, Tennessee.
105. SEPT 23	53 *FR* 37005 (Extension of comment period).	Extension of comment period for the proposed rule clarifying Federally permitted release exemption from reporting and liability provisions, which EPA orginally published on July 19, 1988.
106. SEPT 26	53 *FR* 37344 (Request for comment) (§122(h), (i)).	Proposed administrative settlement for cost recovery action at the Boykin and Ingram Metal Plating Shop site in San Diego, California.
107. SEPT 27	53 *FR* 37643 (Request for comment) (§122(h)).	Proposed administrative settlement for costs incurred in removal action at the Simpson Road Drum site in Atlanta, Georgia.

APPENDIX D
SUPERFUND DOCUMENTS ISSUED DURING FISCAL 1988

Document Number	Title	Date
9200.3-01A	*Superfund Comprehensive Accomplishments Plan Manual, Fiscal 88*	10/01/87
9200.3-04	*Resource Distribution for the Technical Assistance Grant Program (Memorandum)*	06/29/88
9200.3-05	*Flexibility in the FY-88 Extramural Operating Plan*	06/07/88
9200.7-01	*Catalog of Superfund Program Directives*	07/31/88
9230.0-31B	*Community Relations in Superfund: A Handbook* (Interim Version)	03/88
9230.1-02	*Technical Assistance Grants Program Activities Prior to Issuance of Final Rule* (Memorandum)	01/11/88
9230.1-03	*Citizen's Guidance Manual for TAG Grant Program*	06/01/88
9230.1-04	*Superfund TAG Grants Program Regional Guidance Manual*	07/01/88
9230.2-01	*OERR Communications Planning Process*	09/15/88
9230.2-02	*Peer Review and Approval of Abstracts & Papers*	06/26/88
9234.1-01	*CERCLA Compliance with Other Laws Manual* (Draft Guidance Part I)	08/08/88
9234.1-02	*Draft CERCLA Compliance with Other Laws Manual* (Guidance, Part II)	07/14/88
9240.0-03	*Superfund Analytical Data Review and Oversight*	08/18/88
9242.2-01B	*ERCS (Emergency Response Cleanup Services) Contracts Users' Manual*	10/20/87
9242.5-02	*Model Performance Standards for Superfund Project Officers, Deputy Project Officers and Work Assignment Managers/Delivers Order Officers*	09/26/88
9285.1-01C	*Standard Operating Safety Guides*	07/05/88

APPENDIX D
SUPERFUND DOCUMENTS ISSUED DURING FISCAL 1988
(continued)

Document Number	Title	Date
9285.4-03	*Health Assessments by ATSDR in FY-88*	04/07/88
9320.2-3A	*Procedures for Completion and Deletion of National Priorities List Sites* (Draft)	09/88
9345.0-01	*Preliminary Assessment Guidance - FY-88*	02/12/88
9355.0-14	*Compendium of Superfund Field Operations Methods*	12/01/87
9355.0-23	*Interim Guidance on Funding for Ground and Surface Water Restoration Activities*	10/26/87
9355.0-24	*OSWER Strategy for Management Oversight of CERCLA Remedial Action Start Mandate*	12/28/87
9355.3-01	*Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (Draft)	03/88
9355.3-02	*Guidance on Preparing Superfund Decision Documents: The Proposed Plan and the Record of Decision* (Review Draft)	03/88
9355.3-03	*Guidance Document for Providing Alternate Water Supplies*	02/01/88
9355.3-06	*RI/FS Improvements Followup*	04/25/88
9360.0-03B	*Superfund Removal Procedures Revision 3*	02/02/88
9360.0-18	*Removal Program Priorities*	03/31/88
9360.1-01	*Interim Final Guidance on Removal Action Levels at Contaminated Drinking Water Sites*	10/06/87
9360.2-01	*Model Program for Site File Management*	07/18/88
9375.1-04X	*State Participation in Superfund Program Manual*	05/01/88
9375.1-11	*Procurement Under Superfund Remedial Cooperative Agreements*	06/01/88

APPENDIX D
SUPERFUND DOCUMENTS ISSUED DURING FISCAL 1988
(continued)

Document Number	Title	Date
9375.1-12	*State Access to EPA Contractors During Remedial Response*	04/27/88
9375.1-13	*Clarification on Allowability of Management Assistance to States for ERAs and Removals*	09/21/88
9375.2-03	*Funding for State Core Program Cooperative Agreements*	08/21/88
	OWPE DOCUMENTS	
	Interim Guidance on Potentially Responsible Party Participation in Remedial Investigations	05/16/88
	Interim Guidance on Selection of Remedy	12/24/87

APPENDIX E

STATUTORY LANGUAGE FOR THIS REPORT AND EPA AND EXECUTIVE BRANCH IMPLEMENTATION OF CERCLA, AS AMENDED BY SARA

CERCLA Section 301(h) REPORT AND OVERSIGHT REQUIREMENTS

(1) ANNUAL REPORT BY EPA. On January 1 of each year the Administrator of the Environmental Protection Agency shall submit an annual report to Congress of such Agency on the progress achieved in implementing this Act during the preceding fiscal year. In addition, such report shall specifically include each of the following:

(A) A detailed description of each feasibility study carried out at a facility under Title I of this Act.

(B) The status and estimated date of completion of each such study.

(C) Notice of each such study which will not meet a previously published schedule for completion and the new estimated date for completion.

(D) An evaluation of newly developed feasible and achievable permanent treatment technologies.

(E) Progress made in reducing the number of facilities subject to review under section 121(c).

(F) A report on the status of all remedial and enforcement actions undertaken during the prior fiscal year, including a comparison to remedial and enforcement actions undertaken in prior fiscal years.

(G) An estimate of the amount of resources, including the number of work years or personnel, which would be necessary for each department, agency, or instrumentality which is carrying out any activities of this Act to complete the implementation of all duties vested in the department, agency, or instrumentality under this Act.

(2) REVIEW BY INSPECTOR GENERAL. Consistent with the authorities of the Inspector General Act of 1978 the Inspector General of the Environmental Protection Agency shall review any report submitted under paragraph (1) related to EPA's activities for reasonableness and accuracy and submit to Congress, as a part of such report a report on the results of such review.

(3) CONGRESSIONAL OVERSIGHT. After receiving the reports under paragraphs (1) and (2) of this subsection in any calendar year, the appropriate authorizing committees of Congress shall conduct oversight hearings to ensure that this Act is being implemented according to the purposes of this Act and congressional intent in enacting this Act.

APPENDIX E

STATUTORY LANGUAGE FOR THIS REPORT AND EPA AND EXECUTIVE BRANCH IMPLEMENTATION OF CERCLA, AS AMENDED BY SARA (continued)

CERCLA Section 105 NATIONAL CONTINGENCY PLAN

(f) MINORITY CONTRACTORS. In awarding contracts under this Act, the President shall consider the availability of qualified minority firms. The President shall describe, as part of any annual report submitted to the Congress under this Act, the participation of minority firms in contracts carried out under this Act. Such report shall contain a brief description of the contracts which have been awarded to minority firms under this Act and of the efforts made by the President to encourage the participation of such firms in programs carried out under this Act.

CERCLA Section 121(c) REVIEW

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each 5 years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section 104 or 106, the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

EPA AND EXECUTIVE BRANCH IMPLEMENTATION OF CERCLA, AS AMENDED BY SARA

The Superfund Amendments and Reauthorization Act of 1986 (SARA) was passed by the Senate and House of Representatives on October 3 and 8, 1986, respectively, and signed by the President on October 17, 1986.

Section 115 of CERCLA authorizes the President to delegate authorities for executing the Act. In response to the SARA amendments to CERCLA, the President issued Executive Order 12580 on January 23, 1987, delegating authorities and assigning duties to various executive departments and agencies. Primary authority and responsibility for carrying out the Superfund program was assigned to the Administrator of EPA.

Other organizations, departments, and agencies received specific authorities in the Order, e.g., the National Response Team (NRT) plays a role in revision of the National Contingency Plan (NCP) and other specified regulatory and response activities; the Coast Guard generally oversees response in the coastal zone, Great Lakes, ports and harbors; and the Agency for Toxic Substances and Disease Registry (ATSDR) performs various health assessment functions. Executive Order 12580 also revoked the previous Order, No. 12316 of 1981, which had delegated authorities vested in the President by the original Superfund legislation of 1980.

APPENDIX E

STATUTORY LANGUAGE FOR THIS REPORT AND EPA AND EXECUTIVE BRANCH IMPLEMENTATION OF CERCLA, AS AMENDED BY SARA

(continued)

EPA Organization and Operations for CERCLA Implementation

The Administrator signed final internal EPA delegations of authority on December 11, 1986, and on August 14, and September 13 and 21, 1987.

Following delegation from the President, the EPA Administrator may retain all authorities assigned to him; ordinarily, however, he delegates many specific Superfund authorities and responsibilities to the program offices of EPA. Generally, the Administrator delegates authority to senior management officials that report directly to the Administrator.

The Administrator assigns most responsibilities for carrying out specific CERCLA provisions to EPA Regional Administrators and to the Assistant Administrator for the Office of Solid Waste and Emergency Response (OSWER). A wide variety of other EPA offices also play roles in CERCLA implementation. These other offices include the Office of Enforcement and Compliance Monitoring (OECM), the Office of Research and Development (ORD), and the Office of Solid Waste (OSW). Each internal delegation indicates whether or not the authority for executing a Superfund provision may be redelegated. If authority is redelegated, the original delegatee remains accountable to the Administrator for exercising the authority.

Two program offices work within OSWER to administer the major activities of CERCLA. OWPE executes the enforcement-related activities of Superfund through its CERCLA Enforcement Division. OERR is responsible for administering the Superfund response program.

EPA Interagency Agreements and Memoranda of Understanding with Other Federal Agencies

In coordinating CERCLA's implementation, EPA occasionally exchanges goods and services with other Federal agencies and with State governments. Such exchanges are governed by interagency agreements (IAGs).* The IAG is a written agreement designed to carry out a distinct project whose objective is clearly defined. All activities under an IAG must serve the objective through the term of the project. EPA undertook an initiative to promote consistent use of IAGs and to improve accounting and cost documentation practices. A draft manual entitled *Regional Processing of Superfund IAGs* was distributed in July 1987.

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*Agreements between EPA and States governed by a Superfund Memorandum of Agreement focus on environmental problems, objectives, and points of coordination. Such agreements are not considered IAGs.

APPENDIX E

STATUTORY LANGUAGE FOR THIS REPORT
AND
EPA AND EXECUTIVE BRANCH IMPLEMENTATION
OF CERCLA, AS AMENDED BY SARA
(continued)

EPA IAGs may be divided into two major classes. The first class is characterized by an exchange of goods or services for monetary reimbursement, or a sharing of goods and services between two parties. The second class is characterized by a policy agreement or Memorandum of Understanding (MOU). The MOU sets forth the policies and procedures governing the relationship of two parties, or it governs the provision of services without monetary reimbursement. No funds are exchanged under an MOU.

APPENDIX F

EPA INSPECTOR GENERAL REPORT UNDER CERCLA SECTION 301(h)(2)

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 28 1990

MEMORANDUM

THE INSPECTOR GENERAL

SUBJECT: Audit Report No. E1SFF9-11-0015-0100227
Review of the Fisal Year 1988 Superfund Report to Congress

FROM: John C. Martin
Inspector General (A-109)

TO: William K. Reilly
Administrator (A-100)

SUMMARY OF RESULTS

We have completed our review of the Environmental Protection Agency's (EPA) report to Congress on *Progress Toward Implementing Superfund: Fiscal Year 1988* (Annual Report). We found that while some sections of the Annual Report were accurate and reasonable, others were not. Further, the process the Agency used to prepare the Annual Report was not timely. The problems we identified with the accuracy and timeliness of this Annual Report were essentially the same as those we identified for fiscal year 1987 (FY87). However, due to the length of time taken to prepare the FY87 Annual Report, EPA was not able to take corrective action on our FY87 findings in time to affect the quality of the FY88 data or timeliness of the report. EPA has now established a work group to improve the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) input controls, and is performing monthly data quality audits. Further, actions have been taken to improve the process for preparing future Annual Reports in a more timely manner.

Some sections of the Annual Report, such as key information presented in Chapter 5.0 on sites deleted from the National Priorities List (NPL), Chapter 6.0 on the enforcement program, and Chapter 11.0 on the Superfund Innovative Technology Evaluation (SITE) Program, were generally reasonable and accurate. However, certain information presented in Chapters 3.0 and 4.0 was not reasonable or accurate. Significant portions of the accomplishments claimed by the Regions were not supported by valid source documents (see Exhibit 1, page F-14), for several reasons. In some cases the source documentation indicated the action either did not meet Agency definitions or did not occur in fiscal year 1988 ("invalid actions"). In other instances, we were unable to locate adequate supporting documentation to determine whether or when the action occurred ("source documents not located"). Also, program accomplishments figures in the Annual Report were not always complete because CERCLIS is routinely updated months after the fiscal year end.

Appendix A does not always show the original estimated completion dates for Remedial Investigations/Feasibility Studies (RI/FSs) and Remedial Actions (RAs) in-process at the end of FY87. While it identifies delays that occurred during FY88, it does not identify any delays which may have occurred in prior years.

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The process used to prepare the FY88 Annual Report was not fully effective, due to many of the same problems that occurred with the FY87 Annual Report. For example, the Annual Report coordinator's resources were limited, and he had difficulty obtaining some key end of fiscal year data. Also, the tracking system available for the signatory officials was not complete and accurate, thus hindering their monitoring of the process. Finally, the report coordinator was still working on the FY87 Annual Report when this one was past due. As a result, the FY88 Annual Report was submitted to the Office of Management and Budget (OMB) for review one month later than last year's report. And this Annual Report was not completed until December 1989, even though it was due to Congress in January 1989.

SCOPE AND OBJECTIVES

The objectives of our review were to determine whether the Annual Report is reasonable and accurate, as required by section 301(h)(2) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

We began our review on January 30, 1989, at EPA Headquarters and in Regions 4 and 5. We completed virtually all of our work by September 28, 1989, when EPA sent the Annual Report to OMB for review. However, we also reviewed the final changes made to the Annual Report in December 1989, after OMB's review had been completed.

Our work focused on FY88 activities. Numerous auditors familiar with the Superfund program reviewed the entire Annual Report to determine if there were any sections which did not appear to be reasonable and accurate.

We performed detailed audit work in Headquarters and Regions 4 and 5 to verify the accuracy of selected key information presented in the following Annual Report chapters and related appendices:

- 3.0: "Responses at Sites with Hazardous Substance Releases";
- 4.0: "Site Discovery and Assessment";
- 5.0: "The National Priorities List of Sites";
- 6.0: "Enforcement Program Activities";
- 11.0: "Technology-Related Research and Development"; and
- 14.0: "Executive Branch Estimate of Resources Needed to Complete Superfund Implementation".

As previously stated, some of the information in the Annual Report was not finalized until December 1989. In order that our review would not delay the Annual Report any further, we began our field work by using an October 1988 draft, and used updated drafts as they became available. We focused our field work on those items CERCLA specifically required to be included in the Annual Report. We performed detailed audit work in Regions 4 and 5 because of their volume of Superfund activity. Recognizing Regional differences, we hoped in this manner to obtain a balanced, nationwide perspective in our review.

For the information in Chapters 3.0, 4.0, 5.0, and 6.0, we obtained CERCLIS printouts in January 1989, and matched the nationwide summary totals to the totals in the Annual Report. We also selected samples of cases for review in the pre-remedial, removal, remedial, and enforcement programs. We did not secure the printouts from the CERCLIS data base ourselves. Instead, we relied on those provided by the Office of Solid Waste and Emergency Response (OSWER) to define our universe of cases.

For our sample cases, we reviewed the source documentation in Regions 4 and 5 to determine whether the activities claimed met the definitions for valid FY88 actions. The specific source documentation reviewed varied from activity to activity. For example, for Preliminary Assessment (PA) Completions, the official Agency definition states that "a PA is complete when the report is reviewed and accepted by the Region and the PA completion date is entered into CERCLIS." In accordance with this definition, we reviewed source documents showing the review and acceptance of the PA report by the Region, such as the PA report itself and Regional logs; we also reviewed the CERCLIS printout showing the entry of the action into the data base. We performed this same type of review for each of the pre-remedial, removal, remedial, and enforcement actions selected for review. Although virtually every one of our sample items was selected at random, we did not select a statistically valid sample. Therefore, the results of our review should not be projected throughout EPA.

During our review of the FY87 Annual Report, we identified four PA Completions and one RI/FS Start in Region 5 that were claimed in FY87, but should have been counted in FY88. Because of this, we reviewed these five cases specifically to determine whether they were counted again in the FY88 statistics.

We reviewed the information presented in the Agency's report on the SITE Program. Concurrent with our review of the Annual Report, the Office of Inspector General (OIG) was conducting a survey of the SITE Program to ascertain whether an audit was warranted. To determine if the information presented on the SITE Program was reasonable and accurate, we asked the OIG auditors surveying the SITE Program to review this chapter.

We did not perform in-depth audit work on Chapter 14.0, for two reasons. First, most of it is budget information that is readily available within the Agency. Second, section 14.3 was not added to the report until the July 1989 draft, after we had completed our field work.

Throughout the course of our review, we brought the concerns which we identified to the Agency's attention. The Agency corrected most of these concerns.

Except as noted below, our work was performed in accordance with the *Government Auditing Standards* (1988 revision) issued by the Comptroller General of the United States. We did not perform a full scope audit to determine if the Superfund program is achieving the results required by CERCLA, nor did we perform extensive tests to determine if internal controls are adequate. We performed audit work we believed necessary to determine if key information included in the Annual Report is reasonable and accurate. Furthermore, for the items not tested, nothing came to our attention which warranted more detailed audit work than that described in the **DETAILS OF REVIEW** section.

DETAILS OF REVIEW

Annual Report Chapter 3.0 – Responses at Sites with Hazardous Substance Releases

Removal Program

The Annual Report's nationwide and Region 4 and 5 totals for Removal Starts and Removal Completions differed slightly from those on the CERCLIS printouts provided to us. Nationwide Removal Starts totaled 328 in the Annual Report and 326 in CERCLIS. Nationwide Removal Completions totaled 282 in the Annual Report, but only 277 in CERCLIS. Region 4 and 5 Removal Starts totaled 96 in the Annual Report and 95 in CERCLIS, while Region 4 and 5 Removal Completions totaled 87 in the Annual Report and 85 in CERCLIS. OSWER officials attributed these differences to the fact that the larger numbers take into account sites with more than one removal action, whereas the CERCLIS totals equate each site with only one such action.

Of the 47 Removal Starts and 11 Removal Completions we reviewed, 51 (88 percent) were valid FY88 actions. However, seven of the actions were not valid FY88 accomplishments.

Four of these seven actions were not valid because, based on official Agency definitions, they should have been recorded in a different fiscal year. In fact, one of these four was actually an FY87 Removal Start that was counted in both FY87 and FY88.

For the other three actions, the source documentation did not show any evidence that the Agency definitions of a start or a completion were met, regardless of the fiscal year involved. For example, the Marietta Mercury Spill site in Region 4 was counted as both an EPA-lead first Removal Start and first Removal Completion, even though the definition was never entirely met in either case. Specifically, EPA received notification of "about a six ounce mercury spill" on the floor of a personal residence in Marietta, Georgia. The On-Scene Coordinator (OSC) first mobilized a contractor to assist in removing the mercury. The OSC then went to the residence and was told EPA's assistance was not required. The resident of the home said that a relative would help in removing the mercury. The OSC subsequently stated in a memorandum to his file that EPA did not use the contractor to do any removal actions at the residence. EPA paid $1,000 to mobilize the contractor, even though the contractor's services were not needed.

OSWER Directive 9200.3-1A states that a first Removal Start occurs when removal activity has begun. Furthermore, the directive states that a first Removal Completion is counted on the day the on-site removal action is completed. We believe that the Marietta Mercury Spill site does not meet the Agency definition of a Removal Start or a Removal Completion. In addition, our review of CERCLIS revealed that this site was also counted as a responsible party-lead subsequent Removal Start and Removal Completion, because the resident of the house stated she would clean up the mercury.

Figure 1 provides the detailed results of our removal program review.

Figure 1

REMOVAL PROGRAM

	Removal Starts			Removal Completions		
	Regions: 4	5	Total	Regions: 4	5	Total
Number in the Annual Report	62	34	96	55	32	87
Universe per CERCLIS	62	33	95	55	30	85
Sample Size	29	18	47	7	4	11
Valid FY88 Actions	26	16	42	6	3	9
Source Documents Not Located	0	0	0	0	0	0
Invalid FY88 Actions	3	2	5	1	1	2

Remedial Program

Both the Annual Report and the CERCLIS printouts listed 150 RI/FS Starts nationwide in FY88. For the two Regions which we reviewed, CERCLIS reported 42 RI/FS Starts. We sampled 13 RI/FS Starts and determined that all 13 were valid FY88 actions.

We found that the number of Records of Decision (RODs) listed in the Annual Report as completed nationwide during FY88 was almost identical to CERCLIS. The Annual Report listed 152 and CERCLIS listed 154 RODs in FY88. CERCLIS identified 37 RODs for Regions 4 and 5, and all 15 RODs we reviewed were valid FY88 actions.

The nationwide totals for Remedial Design (RD) Starts and RA Starts contained in the Annual Report agreed with those on the CERCLIS printouts provided to us. Of the 99 RD Starts during FY88, 28 were in Regions 4 and 5. For RA Starts, these Regions accounted for 18 of the 72 nationwide.

Of the 15 RD Starts and 15 RA Starts we reviewed, 29 (97 percent) were valid FY88 actions. The one invalid action was due to the funds not being obligated on an EPA-lead site as of the end of FY88. The definition of an RD Start for this type of site includes obligating the funds. Figure 2 provides the detailed results of our RD and RA Starts review.

Figure 2

REMEDIAL DESIGN AND REMEDIAL ACTION STARTS

	RD Starts			RA Starts		
	Regions: 4	5	Total	Regions: 4	5	Total
Universe per CERCLIS	10	18	28	8	10	18
Sample Size	4	11	15	8	7	15
Valid FY88 Actions	4	10	14	8	7	15
Source Documents Not Located	0	0	0	0	0	0
Invalid FY88 Actions	0	1	1	0	0	0

CERCLA section 301(h)(1)(C) requires the Agency to include in the Annual Report "notice of each (feasibility) study which will not meet a previously published schedule for completion and the new estimated date for completion." The Annual Report addresses this requirement in Appendix A. It is important for the reader to understand that this appendix shows "previously published" completion dates which were estimated no earlier than the beginning of FY88. For projects in-process at that time, these dates were taken from the column, 9/30/87 Est. Completion included in Appendix D of the FY87 Annual Report. So for these projects, lengthy delays which may have occurred prior to the beginning of FY88 are not shown (see Figure 3 for RI/FS examples). OSWER officials stated that the revised estimated dates of completion contained in the FY87 Annual Report constituted a "previously published schedule," so comparing these dates with the new 1988 estimates satisfied the statutory intent of CERCLA.

Figure 3

STATUS OF REMEDIAL INVESTIGATIONS/ FEASIBILITY STUDIES ON 9/30/88

Site Name	Per FY87 Annual Report: "1/1/87 Est. Completion"	Per FY88 Annual Report: "Previously Pub. Completion Sch."
Kellogg-Deering Well Field	2/88	2/89
Groveland Wells	1/88	4/89
New Bedford Site	2/88	2/89

Annual Report Chapter 4.0 -- Site Discovery and Assessment

Pre-Remedial Program

The nationwide totals for PAs and Site Inspections (SIs) contained in the Annual Report agreed with those on the CERCLIS printouts provided to us. Of the 2,884 PAs completed during FY88, 784 were in Regions 4 and 5. For SIs, these Regions completed 413 of the 1,237 nationwide.

Of the 44 PA Completions and 31 SI Completions we reviewed, 25 (33 percent) were valid FY88 actions. Five were not valid FY88 actions; instead, according to official Agency definitions, they should have been recorded in a different fiscal year. Three of these five were part of a batch of 74 PA reports actually input to CERCLIS on November 4, 1988 (FY89), but which were erroneously recorded as November 4, 1987 (FY88).

In addition, we were unable to locate adequate source documentation for 45 (60 percent) of the 75 sample cases. Specifically, in Region 4 we located all of the reports, but there was no evidence on the reports, such as a date and signature, to show that they had been reviewed and accepted by the Agency. A log was maintained of approximately 60 percent of the reports, but it did not show review and acceptance. Further, some of the reports themselves were undated, and others were very old, in one case dating back to FY81. Region 4 officials stated that they did not document the review and acceptance on the reports because they entered the dates into a computer data base instead. In Region 5, Regional personnel could not locate some of the reports. The Regional log was sporadically maintained during FY88, and as a result, in some cases there were no entries for these reports documenting Agency review and acceptance. Figure 4 provides the detailed results of our review.

Figure 4

PRE-REMEDIAL PROGRAM

	PA Completions			SI Completions		
	Regions:			Regions:		
	4	5	Total	4	5	Total
Universe per CERCLIS	170	614	784	182	231	413
Sample Size	16	28	44	15	16	31
Valid FY88 Actions	0	13	13	0	12	12
Source Documents Not Located	16	12	28	15	2	17
Invalid FY88 Actions	0	3	3	0	2	2

The Annual Report states that the Agency met the January 1, 1988, CERCLA target for completing PAs for all sites in CERCLIS as of October 1986. However, the reader should note that the FY87 Annual Report acknowledged that the Agency may not meet a similar goal for SIs. Part of the reason for this may be a reduction in SI completion volume in FY88. According to Exhibit 1.0-4, the number of FY88 SI Completions was the lowest in the last five years, decreasing from FY87 levels by seven percent. This reduction in volume must have been anticipated, because the Agency established an FY88 target 16 percent lower than the FY87 accomplishment. Although the Agency apparently exceeded its own FY88 target for SI Completions, this target would not have been sufficient to induce Agency components to meet the CERCLA deadline.

Annual Report Chapters 3.0 and 4.0 -- Additional Comments

According to OSWER officials, CERCLIS was expanded and improved during FY88. However, as previously discussed, our review identified concerns with the accuracy of some data in the system. Further examples of system problems include the following:

- In December 1988, we requested that Headquarters OSWER officials provide us CERCLIS printouts from which to select our samples for Regions 4 and 5. We were initially advised that printouts could not be provided due to "data discrepancies." During January 1989, these officials apparently believed the discrepancies were sufficiently resolved, and we received our printouts.

- During our field work, Region 5 officials advised the auditors that they considered the system to contain inaccuracies.

From our discussions and observations in the two Regions, we believe that inadequate input controls continue to hamper the accuracy and reliability of CERCLIS. OSWER officials advised us that a work group has been formed to review these input controls and make recommendations for improvements. In addition, they stated they are conducting monthly data quality audits.

In addition to our concern about the accuracy of the data, CERCLIS accomplishments for FY88 differed depending on the date of the printout. For example, we obtained three different figures for Removal Starts in Region 4. A Headquarters CERCLIS report dated October 19, 1988, listed 62; the draft Annual Report dated February 23, 1989, listed 67; and a Region 4 CERCLIS printout dated March 14, 1989, listed 65.

OSWER Directive 9200.3-1A established a cut-off date of October 17, 1988, for producing final quarter accomplishments reports. However, the Regions did not adhere to the cut-off date and continued to input information into CERCLIS months after the end of the fiscal year. OSWER officials stated that for purposes of completeness, the Agency wants to get all accomplishments into CERCLIS, regardless of lateness. Nevertheless, since the CERCLIS runs used for the Annual Report were generated shortly after the cut-off date, and since the Regions continued to enter accomplishments into the system, the Annual Report may be understating some Agency accomplishments.

The reader should understand that in some instances, activities conducted at a site are claimed in multiple categories, i.e., both as Removals and Remedial Actions. These same activities are apparently considered to meet more than one Agency definition. For example, at the Region 4 Newport Dump site, the documentation in the files stated that "the remedial action was initiated on July 2, 1987 and completed on October 31, 1987." Yet the CERCLIS printouts we received indicated that not one, but three actions occurred on October 30, 1987: a Removal Completion; a first RA Completion; and a final RA Completion. Some Agency officials have devised the term "removials" to apply to these cases; OIG auditors in Region 4 have initiated an audit of this practice.

Following up on our FY87 review, we found that the four PA Completions and one RI/FS Start which Region 5 counted in FY87, but should have recorded in FY88, were not counted again in this year's statistics. However, based on the previously discussed Removal Start which Region 5 counted in both years, the potential exists that other accomplishments may also be doubled counted.

Annual Report Chapter 5.0 – The National Priorities List of Sites

The Annual Report listed five sites deleted from the NPL nationwide in FY88. We obtained documentation from Headquarters which verified that the Agency deleted these five sites from the NPL. Two of the sites deleted were in Region 4, while Region 5 did not have any sites deleted. We did not do any further work in Region 4 validating the completion dates for the two sites deleted.

Annual Report Chapter 6.0 – Enforcement Program Activities

We reviewed four categories of enforcement activities discussed in the Annual Report: Administrative Orders (AOs); RI/FS Settlements; RD/RA Settlements; and Referrals. In most cases, the nationwide CERCLIS totals provided to us agreed with the totals shown in the Annual Report. The only instance in which the nationwide totals did not agree was in the AO category. The CERCLIS printouts showed 202 Unilateral/Administrative Orders, while the Annual Report contained 207.

For our samples of cases selected in each activity category, we were able to locate all appropriate source documents and verify that the actions occurred during FY88, as claimed. Figure 5 outlines the number of sample cases reviewed.

Figure 5

ENFORCEMENT CASES REVIEWED

Enforcement Category	Number of Actions in Regions 4 and 5	Sample Size
Administrative Orders	60	7
RI/FS Settlements	26	13
RD/RA Settlements	12	12
Referrals	31	6

The reader should note that for these settlements, not all parties to the settlement have to be in agreement, nor all monies collected, to meet the EPA definition of an accomplishment. For example, at the time of our review the Consent Decree for the Laskin/Poplar site had been filed in court, but not yet signed by the affected parties, and penalty monies had not actually been collected. There is, therefore, some degree of uncertainty regarding the final resolution of this case.

It is important for the reader to understand that the dollar figures cited in the Annual Report for AOs, RI/FS Settlements, and RD/RA Settlements are estimates made by the Regional officials. In most cases these are not actual monies collected for the Superfund, but rather are estimates of the amount of money saved the Federal Government by having the responsible parties perform the cleanups. Regional officials stated that the estimates are based on normal costs to clean up sites similar to those in question, unless more specific information is available to be used. We requested source documents to validate the amounts of these estimates in Regions 4 and 5, but Regional officials were unable to provide any documentation.

The Annual Report presents enforcement accomplishments in a number of different categories, based on official Agency definitions and statistics tracking. It is important for the reader to understand that the same Superfund site may appear in more than one category. For example in Region 5, the American Anodco, Inc. site was counted in both the Administrative Order and RI/FS Settlement categories. Thus, the reader should not add together the numbers of accomplishments in the different categories to form a picture of the overall enforcement accomplishments at Superfund sites during FY88.

Annual Report Chapter 11.0 -- Technology-Related Research and Development

We reviewed the information presented in the Annual Report on the SITE Program. Concurrent with our review of the Annual Report, the OIG was conducting a survey of the SITE Program. To determine if the information presented on the SITE Program was reasonable and accurate, we asked the auditors working on the SITE Program survey to analyze this chapter. Based on their review, we believe that the information presented on the SITE Program is generally reasonable and accurate.

Annual Report Chapter 14.0 -- Executive Branch Estimate of Resources Needed to Complete Superfund Implementation

We did not perform in-depth audit work on the information in this chapter. Much of it consists of FY88 obligations, the resource estimates from the FY89 Operating Plan, and the Agency's budget request for FY90, all of which is readily available information. Further, section 14.3, on the Agency's estimate of post-FY90 costs to clean up the existing NPL, was added to the draft report after we completed our field work. Consequently, we did not have sufficient time to perform an in-depth review of this information prior to the Agency's scheduled issuance of the final report. However, we do wish to emphasize that the projected dollar figure of approximately $18.6 billion does not address sites which are not presently proposed for listing or actually on the NPL.

Annual Report Preparation Process

As with last year's Annual Report, the process used to prepare this year's was not fully effective. Although this Annual Report was due to Congress January 1, 1989, it was not submitted to OMB for review until September 1989, one month later than last year's report. While the Agency improved the overall timeliness of issuing the report, it was still not completed until December 1989. Many of the reasons for the Annual Report's lateness are the same as last year. These issues need to be addressed if future Annual Reports are to be submitted timely to Congress.

Part of the reason that the Annual Report encountered such difficulties is that the coordinator's resources were limited, thus inhibiting the completion of the prior year's Annual Report. In fact, while we were performing our review of the FY88 Annual Report the coordinator was still devoting much of his time to the FY87 Annual Report. We finished almost all of our field work for the FY88 review prior to the Agency's transmittal of the FY87 Annual Report to Congress.

Another factor contributing to the Annual Report's delay was the fact that the coordinator was unable to secure selected accomplishment figures in a timely manner from Agency offices responsible for compiling them. For example, as previously discussed, we were initially unable to secure CERCLIS printouts from OSWER two months after the end of the fiscal year, due to "data discrepancies."

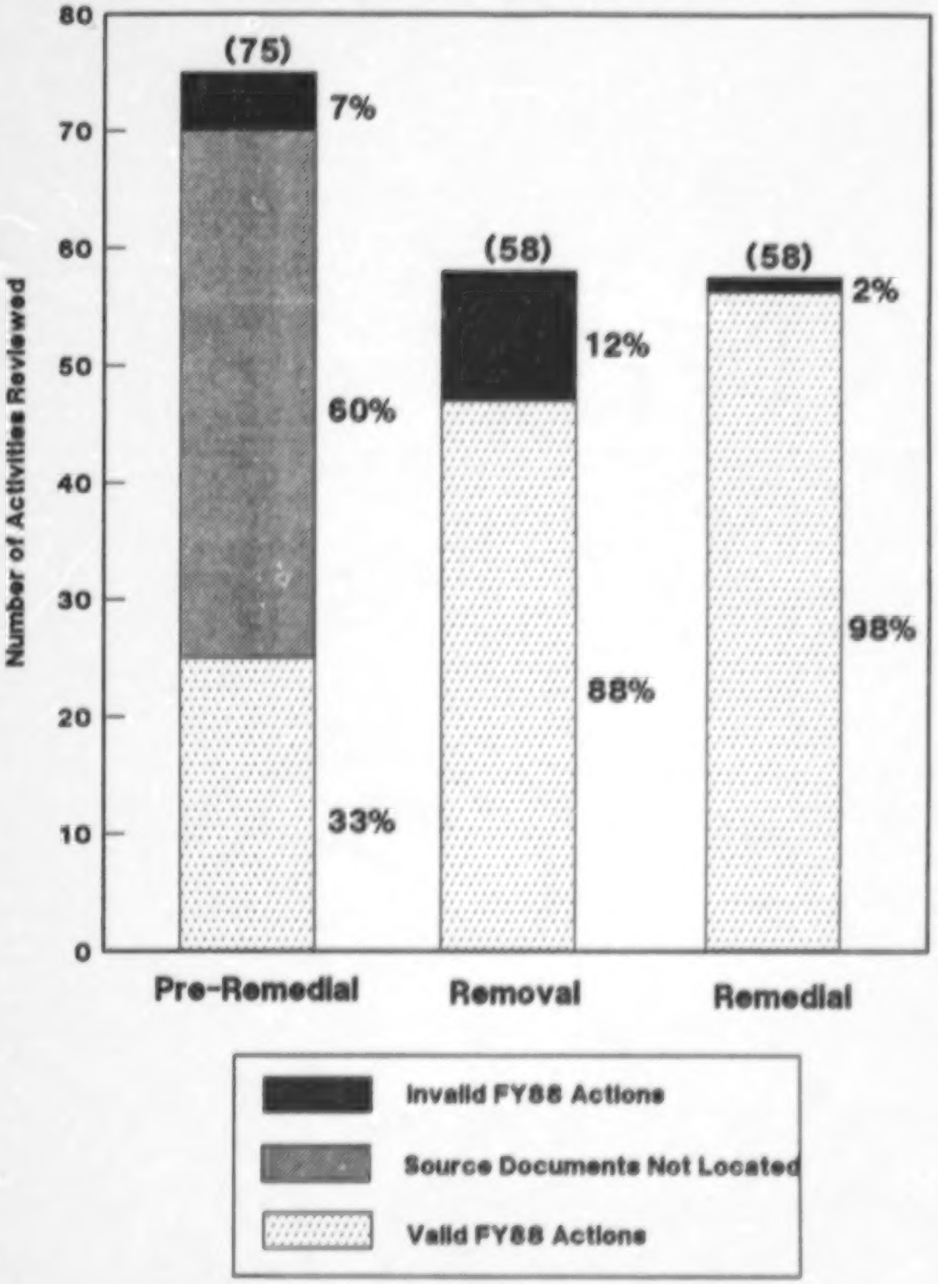
Accurate and complete monitoring information is not available to the signatory officials. The Director, Office of Emergency and Remedial Response, has a tracking system to monitor the status and progress of the Annual Report. However, the tracking system available for the Administrator and the Assistant Administrator for OSWER is incomplete and inaccurate. In June 1989, we secured a printout from the "Statutory Deadlines Tracking System," which contained no record of the FY88 Annual Report. Furthermore, the printout showed that the FY87 Annual Report was completed on February 26, 1988, when, in fact, it was not signed by the Administrator until over a year later. Without accurate and complete monitoring information, officials responsible for signing the Annual Report cannot ensure it is completed on time.

Finally, we are concerned that delays in the FY88 Annual Report will delay future Annual Reports past the January due date to Congress. Preparation of the FY89 Annual Report did not begin until past the point in time necessary to meet the CERCLA deadline.

CERCLA states that the authorizing committees in Congress will hold oversight hearings after receiving the Annual Report, to ensure that the statute is being implemented according to the purposes of the law and congressional intent. The delay in issuing the FY88 Annual Report will not only delay that oversight process, but also did not afford Congress the opportunity to consider any needed action during the FY90 appropriations cycle.

Exhibit 1

Review of Regional Records



APPENDIX G

LIST OF SOURCES

The following is a list of reference sources that were used in the preparation of this Report. Sources for data used in graphics within the text are cited on the graphics and also listed below. Other references were used for background information and also for fiscal year accomplishment data.

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Removal Tracking System, Emergency Response Division.

U.S. Environmental Protection Agency Strategic Planning and Management System.

APPENDIX H

LIST OF ABBREVIATIONS

AA -- Assistant Administrator

A/E -- Architectural/Engineering

ABNs -- Acid and Base/Neutral Compounds

AHE -- Acute Hazardous Events

ANPRM -- Advance Notice of Proposed Rulemaking

AOB -- Analytical Operations Branch

ARARs -- Applicable or Relevant and Appropriate Requirements

ARCS -- Alternative Remedial Contract Strategy

ARIP -- Accident Release Information Program

ASTSWMO -- Association of State and Territorial Solid Waste Management Officials

ATS -- Action Tracking System

ATSDR -- Agency for Toxic Substances and Disease Registry

BBS -- Bulletin Board System

BDAT -- Best Demonstrated Available Technology

BUREC -- U.S. Bureau of Reclamation

CA -- Cooperative Agreement

CAA -- Clean Air Act

CAP -- Capacity Assurance Plan

CDC -- Centers for Disease Control

CDMS -- Cost Documentation Monitoring System

CERCLA -- Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended

CERCLIS -- CERCLA Information System

APPENDIX H
LIST OF ABBREVIATIONS
(continued)

CERI -- Center for Environmental Research Information
CERT -- Council of Energy Resource Tribes
CHRIS -- Chemical Hazard Response Information System
CIS -- Contract Information System
CLP -- Contract Laboratory Program
CMS -- Corrective Measures Study
COE -- U.S. Army Corps of Engineers
CORA -- Cost of Remedial Actions
CPCA -- Core Program Cooperative Agreements
CWA -- Clean Water Act
DERP -- Defense Environmental Restoration Program
DOD -- Department of Defense
DDT -- Dichloro-diphenyl-trichloroethane
DOC -- Department of Commerce
DOH -- Department of Health
DOI -- Department of the Interior
DOJ -- Department of Justice
DOL -- Department of Labor
DOT -- Department of Transportation
DWEL -- Drinking Water Equivalent Level
EDA -- Emergency Declaration Area
EE/CA -- Engineering Evaluation/Cost Analysis
EHS -- Extremely Hazardous Substance
EMSL -- Environmental Monitoring Services Lab

APPENDIX H
LIST OF ABBREVIATIONS
(continued)

EMS-LV -- Enviromental Monitoring Systems Laboratory in Las Vegas, Nevada

EPA -- Environmental Protection Agency

ERAs -- Expedited Response Actions

ERCS -- Emergency Response Cleanup Services

ERD -- Emergency Response Division

ERNS -- Emergency Response Notification System

ERRIS -- Emergency and Remedial Response Information System

ERT -- Emergency Response Team

ESAT -- Environmental Services Assistance Teams

ETP -- Emerging Technologies Program

FAA -- Federal Aviation Administration

FDER -- Florida Department of Environmental Regulation

FEMA -- Federal Emergency Management Agency

FFA -- Federal Facility Agreement

FIFRA -- Federal Insecticide, Fungicide and Rodenticide Act

FIT -- Field Investigation Team

FMS -- Financial Management System

FOIA -- Freedom of Information Act

FTE -- Full-Time Equivalent

FTTA -- Federal Technology Transfer Act

FY -- Fiscal Year

GAO -- General Accounting Office

GICS -- Grants Information Control System

APPENDIX H
LIST OF ABBREVIATIONS
(continued)

GSA	-- General Services Administration
HAZMAT	-- Hazardous Materials
HHS	-- Department of Health and Human Services
HRS	-- Hazard Ranking System
HRSD	-- Hazardous Response Support Division
HSED	-- Hazardous Site Evaluation Division
HSRC	-- Hazardous Substance Research Centers
HSWA	-- Hazardous and Solid Waste Amendments of 1984
IAG	-- Interagency Agreement
IFR	-- Interim Final Rule
IG	-- Inspector General
IRCN	-- Interagency Report Control Number
IRM	-- Initial Remedial Measure
IWT	-- International Waste Technologies
KPEG	-- Potassium Polyethylene Glycolate
LOE	-- Level of Effort
LSI	-- Listing Site Inspection
LTRA	-- Long-Term Response Action
MARAD	-- Maritime Administration
MBDA	-- Minority Business Development Agency
MBDCs	-- Minority Business Development Centers
MBEs	-- Minority Business Enterprises
MCLs	-- Maximum Contaminant Levels
MCLGs	-- Maximum Contaminant Level Goals

APPENDIX H
LIST OF ABBREVIATIONS
(continued)

MOU -- Memorandum of Understanding

MSIS -- Marine Safety Information System

NAAG -- National Association of Attorneys General

NAMC -- National Association of Minority Contractors

NBARs -- Nonbinding Allocations of Responsibility

NCP -- National Oil and Hazardous Substances Pollution Contingency Plan

NEIC -- National Enforcement Investigation Center

NEPA -- National Environmental Policy Act

NFRAP -- "No Further Remedial Action Planned"

NGA -- National Governors Association

NIEHS -- National Institute for Environmental Health Sciences

NOAA -- National Oceanic and Atmospheric Administration

NPL -- National Priorities List

NPRM -- Notice of Proposed Rulemaking

NRC -- National Response Center

NRT -- National Response Team

NTP -- National Toxicological Program

NYSDEC -- New York State Department of Environmental Conservation

O&M -- Operation and Maintenance

OAQPS -- Office of Air Quality Planning and Standards

OECM -- Office of Enforcement and Compliance Monitoring

OERR -- Office of Emergency and Remedial Response

OGC -- Office of General Counsel

APPENDIX H
LIST OF ABBREVIATIONS
(continued)

OHMTADS -- Oil and Hazardous Materials Technical Assistance Data System

OHRM -- Office of Human Resource Management

OIG -- Office of the Inspector General

OMB -- Office of Management and Budget

OMSE -- Office of Management Systems Evaluation

OPA -- Office of Policy Analysis

OPMT -- Office of Program Management and Technology

OPPE -- Office of Policy and Program Evaluation

ORC -- Office of Regional Counsel

ORD -- Office of Research and Development

ORP -- Office of Radiation Programs

OSC -- On-Scene Coordinator

OSDBU -- Office of Small and Disadvantaged Business Utilization

OSHA -- Occupational Safety and Health Administration

OSR -- Office of Standards and Regulations

OSWER -- Office of Solid Waste and Emergency Response

OU -- Operable Unit

OWPE -- Office of Waste Programs Enforcement

PA -- Preliminary Assessment

PADER -- Pennsylvania Department of Environmental Resources

PAHs -- Policyclic Aromatic Hydrocarbons

PAS -- Policy and Analysis Staff

PASS -- Procurement Automated Source System

PCBs -- Polychlorinated Biphenyls

APPENDIX H
LIST OF ABBREVIATIONS
(continued)

PHRED -- Public Health Risk Evaluation Data Base

PIC -- EPA Public Information Center

POTW -- Publicly Owned Treatment Works

PRP -- Potentially Responsible Party

RA -- Remedial Action

RAC -- Response Action Contractor

RASs -- Routine Analytical Services

RCRA -- Resource Conservation and Recovery Act

RCRIS -- Resource Conservation and Recovery Information System

RD -- Remedial Design

REM -- Remedial Planning (Contract)

RFI -- RCRA Facility Investigation

RI/FS -- Remedial Investigation/Feasibility Study

ROD -- Record of Decision

RPM -- Remedial Project Manager

RQ -- Reportable Quantity

RRTs -- Regional Response Teams

RSPS -- Regulatory and Special Project Section

RTS -- Removal Tracking System

SAB -- Science Advisory Board

SACA -- Support Agency Cooperative Agreements

SARA -- Superfund Amendments and Reauthorization Act of 1986

SASs -- Special Analytical Services

SBA -- Small Business Administration

APPENDIX H
LIST OF ABBREVIATIONS
(continued)

SCAP	-- Superfund Comprehensive Accomplishments Plan
SCDHEC	-- South Carolina Department of Health and Environmental Quality
SCEES	-- Superfund Cost Estimating Expert System
SCOR	-- Site Close Out Report
SDC	-- Settlement Decision Committee
SDIC	-- Superfund Docket and Information Center
SDWA	-- Safe Drinking Water Act
SETS	-- Superfund Enforcement Tracking System
SI	-- Site Inspection
SIC	-- Standard Industrial Classification
SITE	-- Superfund Innovative Technology Evaluation
SMOA	-- Superfund Memorandum of Agreement
SMCRA	-- Surface Mining Control and Reclamation Act
SPHEM	-- Superfund Public Health Evaluation Manual
SPMS	-- Strategic Planning and Management System
SSCs	-- State Superfund Contracts
SSI	-- Screening Site Inspection
STSP	-- Superfund Technical Support Program
SWCB	-- State Water Control Board
SWDA	-- Safe Drinking Water Act
TAGs	-- Technical Assistance Grants
TAT	-- Technical Assistance Team
TCEA	-- 1,1,1-Trichloroethane
TDD	-- Telecommunications Device for the Deaf

APPENDIX H
LIST OF ABBREVIATIONS
(continued)

T&E	-- Test and Evaluation
TES	-- Technical Enforcement Support
TIB	-- Toxics Integration Branch
TPDs	-- Training Planning Documents
TPQ	-- Threshold Planning Quantity
TSCA	-- Toxic Substances Control Act
TSDFs	-- Treatment, Storage, or Disposal Facilities
TSP	-- Technology Support Project
USCG	-- United States Coast Guard
USDA	-- U.S. Department of Agriculture
UST	-- Underground Storage Tank
VA	-- Veterans Administration
VOCs	-- Volatile Organic Compounds
VORCE	-- Volume Reduction/Chemical Extraction Process
VORRP	-- Volume Reduction Research Project
WBEs	-- Women's Business Enterprises
WQC	-- Water Quality Criteria

APPENDIX H
LIST OF ABBREVIATIONS
(continued)

STATE ABBREVIATIONS

AK -- Alaska
AL -- Alabama
AR -- Arkansas
AS -- American Samoa
AZ -- Arizona
CA -- California
CO -- Colorado
CM -- Commonwealth of the Marianas
CT -- Connecticut
DE -- Delaware
FL -- Florida
GA -- Georgia
GU -- Guam
HI -- Hawaii
IA -- Iowa
ID -- Idaho
IL -- Illinois
IN -- Indiana
KS -- Kansas

KY -- Kentucky
LA -- Louisiana
MA -- Massachusetts
MD -- Maryland
ME -- Maine
MI -- Michigan
MN -- Minnesota
MO -- Missouri
MS -- Mississippi

MT -- Montana
NC -- North Carolina
ND -- North Dakota
NE -- Nebraska
NH -- New Hampshire
NJ -- New Jersey
NM -- New Mexico
NV -- Nevada
NY -- New York
OH -- Ohio
OK -- Oklahoma
OR -- Oregon
PA -- Pennsylvania
PR -- Puerto Rico
RI -- Rhode Island
SC -- South Carolina
SD -- South Dakota
TN -- Tennessee
TTPI -- Trust Territory of the Pacific Islands
TX -- Texas
UT -- Utah
VA -- Virginia
VI -- Virgin Islands
VT -- Vermont
WA -- Washington
WI -- Wisconsin
WV -- West Virginia
WY -- Wyoming

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